

NAS8-35471  
DPD 614  
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Work Breakdown Structure  
and Dictionary

**BOEING**

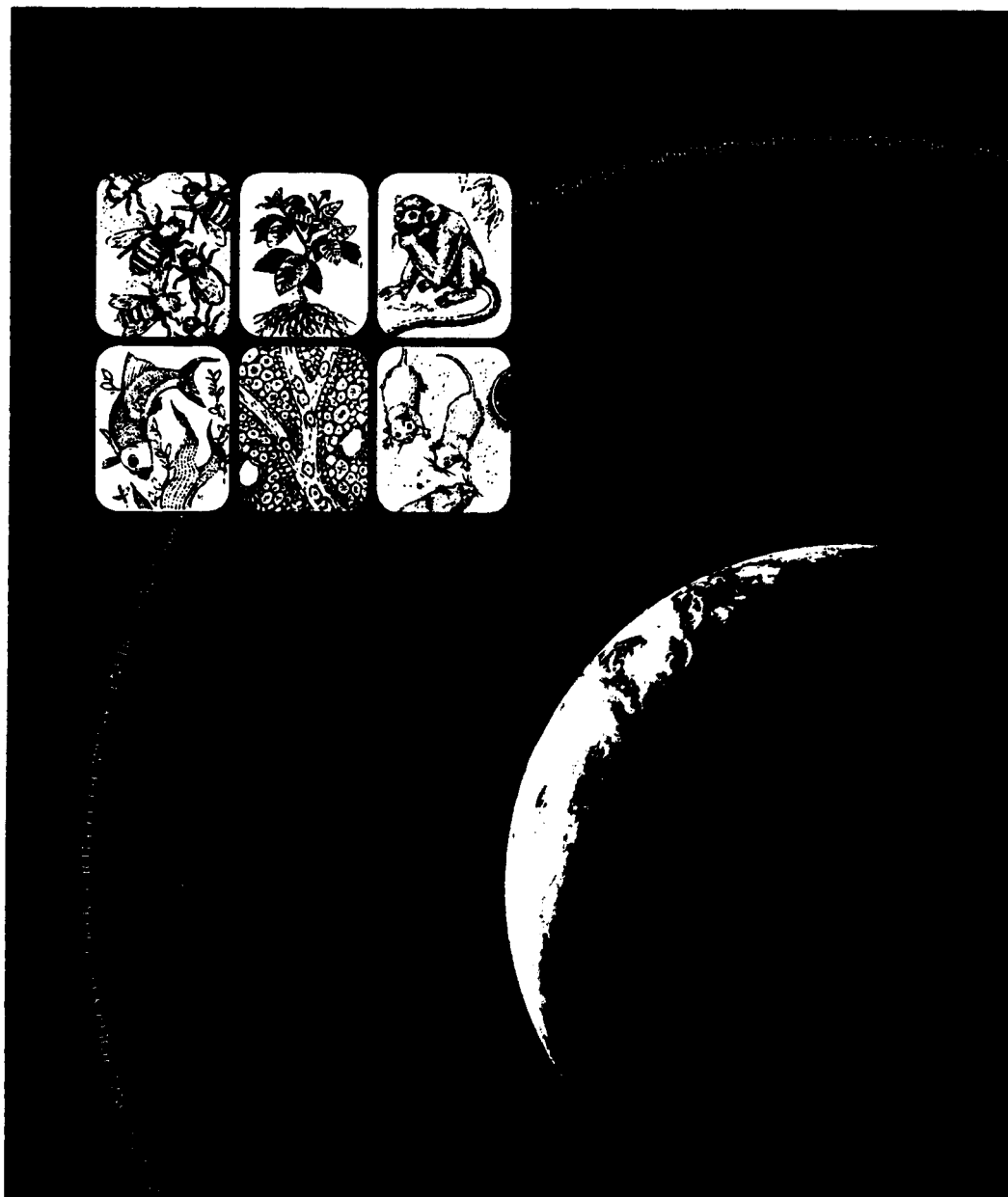
Technology  
Incorporated

**NASA**

Final Report  
Volume II  
Appendix E

October 1985

## System Analysis Study of Space Platform and Station Accommodations for Life Sciences Research Facilities



(NASA-CR-179274) SYSTEM ANALYSIS STUDY OF  
SPACE PLATFORM AND STATION ACCOMMODATIONS  
FOR LIFE SCIENCES RESEARCH FACILITIES.  
VOLUME 2: STUDY RESULTS. APPENDIX E: WORK  
BREAKDOWN STRUCTURE AND DICTIONARY Final

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SYSTEM ANALYSIS STUDY OF SPACE PLATFORM  
AND STATION ACCOMMODATIONS  
LIFE SCIENCES RESEARCH FACILITIES

CONTRACT NAS 8-35471

FINAL REPORT

VOLUME II - STUDY RESULTS

APPENDIX E

D180-27863-2 II

WORK BREAKDOWN STRUCTURE AND DICTIONARY

October 1985

For

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION  
MARSHALL SPACE FLIGHT CENTER  
HUNTSVILLE, AL 35812

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## FORWARD

The System Analysis Study of Space Platform and Station Accommodations for Life Sciences Research Facilities (Contract NA58-35471) was initiated May 19, 1983 and completed December 18, 1983. This study was one of two parallel studies conducted for the NASA Marshall Space Flight Center. The Contracting Officer's Representative and Study Manager was Dr. John D. Hilchey.

This study was conducted by the Boeing Aerospace Company, Seattle, WA, and a subcontractor: Technology Incorporated, Houston, TX.

The study final report is contained in three volumes with three appendices attached to Volume II as shown below:

- D180-27863-1 Volume I - Executive Summary
- D180-27863-2 Volume II - Study Results
  - Appendix A - Parametric Analysis Data Package
  - Appendix B - Tradeoff Analysis Data Package
  - Appendix C - Preliminary Conceptual Design Requirements Data Package
- D180-27863-3 Volume III - final Briefing Book

Change Order No. 3 to contract NA58-35471 extended the period of performance through 31 December 1984 and defined statement of work changes. The study results from these changes are reported as Attachment I to Volume II of the Final Report as shown below:

- D180-27863-21 Attachment I - Indepth Trade Analysis

Change Orders 6, 7, and 8 to contract NAS8-35471 defined statement of work changes and extended the period of performance through November 1, 1985. The study results from these changes are reported as Attachment II to Volume II of the Final Report.

Additional appendices have been added to the documentation as shown below:

D180-27863-2II Attachment II - Phase A Conceptual Design and Programmatic

Appendix D - Requirements

Appendix E - Work Breakdown Structure and Dictionary

Appendix F - Conceptual Layouts and Drawings

**LIST OF ACRONYMS AND ABBREVIATIONS**

|       |  |
|-------|--|
| 100K  | Refers to Class 100,000 cleanroom                      |
| 10K   | Refers to Class 10,000 cleanroom                       |
| AEM   | Animal Enclosure Module                                |
| ASE   | Airborne Support Equipment                             |
| ATMO  | Atmosphere Control System (a design function)          |
| BAC   | Boeing Aerospace Company                               |
| CDG   | Concept Development Group                              |
| CELSS | Controlled Ecological Life Support System              |
| CER   | Cost Estimating Relationships                          |
| C.G.  | Center of Gravity                                      |
| CHEM  | Chemical Analysis Instrumentation (a design function)  |
| CONF  | Confinement System (a design function)                 |
| CONS  | Consumables (a design function)                        |
| DATA  | Data Management System (a design function)             |
| DDT&E | Design, Development, Test, and Evaluation              |
| ECLS  | Environmental Control Life Support                     |
| ECLSS | Environmental Control Life Support System              |
| ECS   | Environmental Control System                           |
| ELEC  | Electrical Power Management System (a design function) |
| EM    | Engineering Model                                      |
| EMER  | Emergency Power System (a design function)             |

|                |  |
|----------------|--|
| EMU            | Extravehicular Mobility Unit                     |
| ESE            | Experiment Support Equipment (a design function) |
| EVA            | Extravehicular Activity                          |
| g              | Gravity  |
| GSE            | Ground Support Equipment                         |
| Host           | Refers to Space Station                          |
| HVAC           | Heating, Ventilation and Air Conditioning        |
| HYG            | Hygiene (a design function)                      |
| IOC            | Initial Operational Capability                   |
| IVA            | Intravehicular Activity                          |
| kbps           | Kilobits per second                              |
| kg             | Kilograms  |
| KSC            | Kennedy Space Center                             |
| kw             | Kilowatts  |
| K\$            | Thousands of dollars                             |
| LIGH           | Illumination (a design function)                 |
| LSRF           | Life Sciences Research Facility                  |
| LM             | Logistic Module                                  |
| m <sup>3</sup> | Cubic meters                                     |
| MICR           | Microscopy (a design function)                   |
| M.I.T.         | Massachusetts Institute of Technology            |

|      |   |
|------|---|
| MMU  | Manned Maneuvering Unit                           |
| MPS  | Materials Processing in Space                     |
| MMSE | Multi-mission support equipment                   |
| MSFC | Marshall Space Flight Center                      |
| O&C  | Operations and Checkout                           |
| OMV  | Orbital Maneuvering Vehicle                       |
| OPF  | Orbiter Processing Facility                       |
| ORU  | Orbital Replacement Unit                          |
| OTV  | Orbital Transfer Vehicle                          |
| PI   | Principal Investigator                            |
| P/L  | Payload   |
| RAHF | Research Animal Holding Facility                  |
| REFR | Refrigeration (a design function)                 |
| RSS  | Rotating Service Structure                        |
| SIMG | Gravity Simulation (a design function)            |
| SL   | Spacelab  |
| SLF  | Shuttle Landing Facility                          |
| SS   | Space Station                                     |
| STOW | Storage (a design function)                       |
| STRU | Structures (a design function)                    |
| STS  | Space Transportation System                       |
| SWST | Solid Waste Management System (a design function) |

|       |   |
|-------|---|
| TDRSS | Tracking and Data Relay Satellite System    |
| THER  | Thermal Control System (a design function)  |
| TRAN  | Transportability (a design function)        |
|       |   |
| VAB   | Vehicle Assembly Building                   |
| VPF   | Vertical Processing Facility                |
|       |   |
| WBS   | Work Breakdown Structure                    |
| WWTR  | Water Management System (a design function) |



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This document was developed to provide the framework for task planning and control. It is the basis for budgeting, task assignment, cost collection and reporting, and is the vehicle that permits contractual performance measurement and tracking of the Full Scale Development Phase tasks. This document sets forth and describes the Life Sciences Program WBS elements to level 5.

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1.0 WORK BREAKDOWN STRUCTURE INDEX

| Work Breakdown Structure Index |  | Life Sciences Program |   | Contract Number NAS8-35471 | Date |   |   |            |
|--------------------------------|--|-----------------------|---|----------------------------|------|---|---|------------|
| Line No.                       | Work Breakdown Structure Element/Tasks   |                       |   |                            |      |   |   | WBS Number |
|                                | 1  | 2                     | 3 | 4                          | 5    | 6 | 7 |            |
| 1                              | Life Sciences Program                    |                       |   |                            |      |   |   |            |
| 2                              | System Project Management                |                       |   |                            |      |   |   | 1.0        |
| 3                              | System Engineering                       |                       |   |                            |      |   |   | 1.1        |
| 4                              | System Definition                        |                       |   |                            |      |   |   | 1.1.1      |
| 5                              | Interface Definition                     |                       |   |                            |      |   |   | 1.1.2      |
| 6                              | System Effectiveness Engineering         |                       |   |                            |      |   |   | 1.1.3      |
| 7                              | System Safety                            |                       |   |                            |      |   |   | 1.1.4      |
| 8                              | Project Management                       |                       |   |                            |      |   |   | 1.2        |
| 9                              | Costs, Schedules, Performance Management |                       |   |                            |      |   |   | 1.2.1      |
| 10                             | Configuration Management                 |                       |   |                            |      |   |   | 1.2.2      |
| 11                             | Data Information Management              |                       |   |                            |      |   |   | 1.2.3      |
| 12                             | Design to Cost                           |                       |   |                            |      |   |   | 1.2.4      |
| 13                             | Engineering Supervision and Clerical     |                       |   |                            |      |   |   | 1.2.5      |
| 14                             | Quality Assurance                        |                       |   |                            |      |   |   | 1.2.6      |
| 15                             | Manufacturing Engineering                |                       |   |                            |      |   |   | 1.2.7      |

| Work Breakdown Structure Index |           | Life Sciences Program                  |            | Contract Number | Date |     |   |     |
|--------------------------------|-----------|--|------------|-----------------|------|-----|---|-----|
| Line No.                       | WBS Level | Work Breakdown Structure Element/Tasks | WBS Number |                 |      |     |   |     |
| 1                              | 2         | 3                                      | 4          |                 |      | 5   | 6 | 7   |
| 16                             |           | Data                                   |            |                 |      |     |   | 2.0 |
| 17                             |           | Technical Publications                 |            |                 |      |     |   | 2.1 |
| 18                             |           | Engineering Data                       |            |                 |      |     |   | 2.2 |
| 19                             |           | Support Data                           |            |                 |      | 2.3 |   |     |



| Work Breakdown Structure Index |  | Life Sciences Program |   | Contract Number NAS8-35471 | Date |   |   |            |
|--------------------------------|--|-----------------------|---|----------------------------|------|---|---|------------|
| Line No.                       | Work Breakdown Structure Element/Tasks |                       |   |                            |      |   |   | WBS Number |
|                                | 1                                      | 2                     | 3 | 4                          | 5    | 6 | 7 |            |
| 24                             | Ground Support Equipment               |                       |   |                            |      |   |   | 4.0        |
| 25                             | Electrical Support Equipment           |                       |   |                            |      |   |   | 4.1        |
| 26                             | Servicing Equipment                    |                       |   |                            |      |   |   | 4.2        |
| 27                             | Fixtures and Stands                    |                       |   |                            |      |   |   | 4.3        |
| 28                             | Contamination Control                  |                       |   |                            |      |   |   | 4.4        |
| 29                             | Handling Equipment                     |                       |   |                            |      |   |   | 4.5        |
| 30                             | Transporters                           |                       |   |                            |      |   |   | 4.6        |
| 31                             | Storage and Shipping                   |                       |   |                            |      |   |   | 4.7        |
| 32                             | Support Equipment Tooling              |                       |   |                            |      |   |   | 4.8        |

| Work Breakdown Structure Index |           | Life Sciences Program |   | Contract Number | Date |
|--------------------------------|-----------|-----------------------|---|-----------------|------|
| Line No.                       | WBS Level |                       | Work Breakdown Structure Element/Tasks      | WBS Number      |      |
|                                | 1         | 2                     |   |                 |      |
| 33                             | 1         | 2                     | Life Sciences Module System                 | 5.0             |      |
| 34                             |           |                       | Space Station Common Module                 | 5.1             |      |
| 35                             |           |                       | Integration and Assembly                    | 5.2             |      |
| 36                             |           |                       | Life Sciences (Non-human) Module Outfitting | 5.3             |      |
| 37                             |           |                       | Integration and Assembly                    | 5.3.1           |      |
| 38                             |           |                       | Subsystems                                  | 5.3.2           |      |
| 39                             |           |                       | Integration and Assembly                    | 5.3.2.1         |      |
| 40                             |           |                       | Structures and Mechanisms                   | 5.3.2.2         |      |
| 41                             |           |                       | Electrical Power                            | 5.3.2.3         |      |
| 42                             |           |                       | Thermal Control                             | 5.3.2.4         |      |
| 43                             |           |                       | Data Management                             | 5.3.2.5         |      |
| 44                             |           |                       | ECLS  | 5.3.2.6         |      |
| 45                             |           |                       | Habitability/Man Systems                    | 5.3.2.7         |      |
| 46                             |           |                       | Distribution Utility Networks               | 5.3.3           |      |
| 47                             |           |                       | Integration and Assembly                    | 5.3.3.1         |      |
| 48                             |           |                       | Mechanical Utility                          | 5.3.3.2         |      |



| Work Breakdown Structure Index |  | Life Sciences Program |   | Contract Number | Date |   |            |   |          |
|--------------------------------|--|-----------------------|---|-----------------|------|---|------------|---|----------|
| Line No.                       | Work Breakdown Structure Element/Tasks |                       |   |                 |      |   | WBS Number |   |          |
|                                | 1                                      | 2                     | 3 | 4               | 5    | 6 |            | 7   |          |
| 49                             |  |                       |   |                 |      |   |            | Electrical Utility                                | 5.3.3.3  |
| 50                             |  |                       |   |                 |      |   |            | Laboratory Equipment                              | 5.3.4.0  |
| 51                             |  |                       |   |                 |      |   |            | Integration and Assembly                          | 5.3.4.1  |
| 52                             |  |                       |   |                 |      |   |            | Specimen Holding Facilities                       | 5.3.4.2  |
| 53                             |  |                       |   |                 |      |   |            | Specimen Research Centrifuge                      | 5.3.4.3  |
| 54                             |  |                       |   |                 |      |   |            | Centrifuge Cage Units                             | 5.3.4.4  |
| 55                             |  |                       |   |                 |      |   |            | Vestibular Research Facility                      | 5.3.4.5  |
| 56                             |  |                       |   |                 |      |   |            | Common Holding Facility Support Equipment         | 5.3.4.6  |
| 57                             |  |                       |   |                 |      |   |            | Metabolic Monitoring System                       | 5.3.4.7  |
| 58                             |  |                       |   |                 |      |   |            | Laboratory Equipment                              | 5.3.4.8  |
| 59                             |  |                       |   |                 |      |   |            | Preservation Systems                              | 5.3.4.9  |
| 60                             |  |                       |   |                 |      |   |            | Data Collection and Processing Systems            | 5.3.4.10 |
| 61                             |  |                       |   |                 |      |   |            | Bio-Instrumentation                               | 5.3.4.11 |
| 62                             |  |                       |   |                 |      |   |            | Work Benches                                      | 5.3.4.12 |
| 63                             |  |                       |   |                 |      |   |            | Kits  | 5.3.4.13 |
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| 65                             |  |                       |   |                 |      |   |            | Miscellaneous Equipment                           | 5.3.4.15 |
| 66                             |  |                       |   |                 |      |   |            | Life Sciences (Human Resources) Module Outfitting | 5.4      |
| 67                             |  |                       |   |                 |      |   |            | Attached Science Payload Accommodation            | 5.4      |

| Work Breakdown Structure Index |           | Life Sciences Program |   | Contract Number | Date       |
|--------------------------------|-----------|-----------------------|---|-----------------|------------|
| Line No.                       | WBS Level |                       | Work Breakdown Structure Element/Tasks                            | WBS Number      | NAS8-35471 |
|                                | 1         | 2                     |   |                 |            |
| 68                             |           |                       | Launch Operations   | 6.0             |            |
| 69                             |           |                       | Prelaunch Preparation   | 6.1             |            |
| 70                             |           |                       | Launch Support  | 6.2             |            |
| 71                             |           |                       | Initial Spares and Repair Parts                                   | 7.0             |            |
| 72                             |           |                       | Logistics Support/Outfitting                                      | 8.0             |            |
| 73                             |           |                       | Live Specimen Transporter   | 8.1             |            |
| 74                             |           |                       | Integration and Assembly  | 8.1.1           |            |
| 75                             |           |                       | ECLS  | 8.1.2           |            |
| 76                             |           |                       | Electrical  | 8.1.3           |            |
| 77                             |           |                       | Specimen Holding Facility   | 8.1.4           |            |
| 78                             |           |                       | Structures and Mechanisms   | 8.1.5           |            |
| 79                             |           |                       | Consumable and Waste Support                                      | 8.2             |            |
| 80                             |           |                       | Maintenance and Repair Parts                                      | 8.3             |            |
| 81                             |           |                       | Configuration Change Equipment Processing                         | 8.4             |            |
| 82                             |           |                       | Pre-mission and Post Mission Specimens and Biological Sample Care | 8.5             |            |

| Work Breakdown Structure Index |           | Life Sciences Program |  | Contract Number | Date       |
|--------------------------------|-----------|-----------------------|--|-----------------|------------|
| Line No.                       | WBS Level |                       | Work Breakdown Structure Element/Tasks | WBS Number      | NAS8-35471 |
|                                | 1         | 2 3 4 5 6 7           |  |                 |            |
| 83                             |           |                       | System Test and Evaluation             | 9.0             |            |
| 84                             |           |                       | Development Test and Evaluation        | 9.1             |            |
| 85                             |           |                       | System tests                           | 9.1.1           |            |
| 86                             |           |                       | System segment tests                   | 9.1.2           |            |
| 87                             |           |                       | Mock-up/Simulators                     | 9.2             |            |
| 88                             |           |                       | Test and Evaluation Support            | 9.3             |            |
| 89                             |           |                       | Test Facilities                        | 9.4             |            |
| 90                             |           |                       | Training and Simulation                | 10.0            |            |
| 91                             |           |                       | Equipment                              | 10.1            |            |
| 92                             |           |                       | Materials                              | 10.2            |            |
| 93                             |           |                       | Services                               | 10.3            |            |
| 94                             |           |                       | Facilities                             | 10.4            |            |
| 95                             |           |                       | Mission Operations                     | 11.0            |            |

2.0 WORK BREAKDOWN STRUCTURE DICTIONARY

| Work Breakdown Structure Dictionary   |              |                                    |                  |   |  | Contract Number<br>NAS8-35471 |  |
|---|--------------|------------------------------------|------------------|---|--|-------------------------------|--|
| Index Item No.  |              | Life Sciences Program              |                  |   |  | WBS Level 1                   |  |
| WBS Element/<br>PMC 0.0   |              | WBS Title<br>Life Sciences Program |                  | Contract Line Item:<br>All  |  | Contract Element              |  |
| Date  | Revision No. | Revision Authority                 | Approved Changes |   |  |                               |  |
| Specification No.   |              | Specification Title                |                  |   |  |                               |  |
| <b>Technical Content</b><br>This element consists of the summary of all resources required to design, develop, produce, test, deliver and provide operations support for the Life Sciences Program<br>The lower level elements are:<br>1.0 - System Project Management<br>2.0 - Data<br>3.0 - Ground Facilities<br>4.0 - Ground Support Equipment<br>5.0 - Life Sciences Modular System<br>6.0 - Launch Operations<br>7.0 - Initial Spares and Repair Parts<br>8.0 - Logistics Support/Outfitting<br>9.0 - System Test and Evaluation<br>10.0 - Training and Simulation<br>11.0 - Mission Operations<br><br><b>Applicable Statement of Work Paragraph<br/>Total SOW</b> |              |                                    |                  | <b>MPC/PMC</b><br><br><b>Cost Description</b><br>Work order/Work Auth<br><br><b>Cost Content-System Contractor</b><br>This element is the total Life Sciences Program summary of direct and indirect costs. |  |                               |  |

| Work Breakdown Structure Dictionary   |  |                    |                  |                  |   | Contract Number<br>NAS 8-345471   |
|---|--|--------------------|------------------|------------------|---|---|
| Index Item No.  | Life Sciences Program                  |                    |                  | WBS Level        | 2 |   |
| WBS Element/<br>PMC 1.0   | WBS Title<br>System/Project Management |                    |                  | Contract Element |   |   |
| Date  | Revision No.                           | Revision Authority | Approved Changes |                  |   |   |
| Specification No.   | Specification Title                    |                    |                  |                  |   |   |
| <p><b>Technical Content</b><br/> The Systems/Project Management element summarizes systems engineering and technical control as well as business management of the life sciences program. It encompasses the planning, directing, and controlling the definition, development and production of an integrated life sciences facility.</p> <p>The lower elements are:<br/> 1.1 - Systems Engineering<br/> 1.2 - Project Management</p> <p>Applicable Statement of Work Paragraph</p> |  |                    |                  |                  |   | <p><b>Cost Description</b><br/> Work order/Work Auth</p> <p><b>MPC/PMC</b></p> <p><b>Cost Content-System Contractor</b><br/> For cost purposes this is a summary item only.</p> |

| Work Breakdown Structure Dictionary   |              |                                  |                  |  |                     | Contract Number<br>NAS 8-35471 |  |
|---|--------------|----------------------------------|------------------|--|---------------------|--------------------------------|--|
| Index Item No.  |              | Life Sciences Program            |                  |  | WBS Level 3         |                                |  |
| WBS Element/<br>PMC 1.1   |              | WBS Title<br>Systems Engineering |                  |  | Contract Element    |                                |  |
| Date  | Revision No. | Revision Authority               | Approved Changes |  | Contract Line Item: |                                |  |
| Specification No.   |              | Specification Title              |                  | MPC/PMC  |                     |                                |  |
| <b>Technical Content</b><br>The Systems Engineering elements consists of the effort of directing and controlling a totally integrated engineering effort including systems engineering, design engineering, support engineering, and specialty fields (reliability, maintainability, systems effectiveness, safety, human factors, etc). Includes system definition, overall systems design, design integrity analysis, weight and balance analysis, and intrasystem and intersystem compatibility analysis.<br><br>The lower level elements are:<br>1.1.1 - Systems Definition<br>1.1.2 - Interface Definition<br>1.1.3 - Systems Effectiveness Engineering<br>1.1.4 - Systems Safety<br><br><b>Applicable Statement of Work Paragraph</b> |              |                                  |                  | <b>Cost Description</b><br>Work order/Work Auth<br><br><b>Cost Content-System Contractor</b><br>For cost purposes this is a summary item only. |                     |                                |  |

## Work Breakdown Structure Dictionary

|   |   |                           |                         |  |  |  |  |
|---|---|---------------------------|-------------------------|--|--|--|--|
| <b>Index Item No. Life Sciences Program</b>   |   |                           |                         |  | <b>WBS Level 4</b>   | <b>Contract Number<br/>NAS 8-35471</b>           |  |
| <b>WBS Element/<br/>PMC 1.1.1</b>   | <b>WBS Title<br/>Systems Definition</b> |                           |                         |  | <b>Contract Element</b>  |  |  |
| <b>Date</b>   | <b>Revision No.</b>                     | <b>Revision Authority</b> | <b>Approved Changes</b> |  | <b>Contract Line Item:</b>   |  |  |
| <b>Specification No.</b>  | <b>Specification Title</b>              |                           |                         |  | <b>MPC/PMC</b>   | <b>Cost Description<br/>Work order/Work Auth</b> |  |
| <b>Technical Content</b><br>The System Definition element consists of the engineering effort required to define and maintain the Life Sciences Systems. Included are system analysis, design, test and evaluation to ensure compatibility of all system elements. |   |                           |                         |  | <b>Cost Content-System Contractor</b><br>This element consists of Engineering Labor, Outplant Labor, Production Material, Purchased Engineering. |  |  |
| <b>Applicable Statement of Work Paragraph</b>   |   |                           |                         |  |  |  |  |

D483-10041-1

083L/WBS 006/new



|   |              |                                   |                  |   |  |                                |  |
|---|--------------|-----------------------------------|------------------|---|--|--------------------------------|--|
| <b>Work Breakdown Structure Dictionary</b>  |              |                                   |                  |   |  | Contract Number<br>NAS 8-35471 |  |
| Index Item No. Life Sciences Program  |              |                                   |                  | WBS Level 4   |  | Contract Element               |  |
| WBS Element/<br>PMC 1.1.2   |              | WBS Title<br>Interface Definition |                  |   |  | Contract Line Item:            |  |
| Date  | Revision No. | Revision Authority                | Approved Changes |   |  |                                |  |
| Specification No.   |              | Specification Title               |                  |   |  |                                |  |
| <b>Technical Content</b><br>The Interface Definition element consists of the systems engineering and integration associated with the Life Sciences Program interfaces. Included is the analysis of interface test and checkout, analysis of configuration changes, analysis of recommended changes, and the submittal and maintenance of the Interface Control Documents. Support all Interface Control Working Group activities which address Life Sciences Program system interfaces. |              |                                   |                  | <b>Cost Description</b><br>MPC/PMC<br>Work order/Work Auth<br>Cost Content-System Contractor<br>This element consists of Engineering Labor. |  |                                |  |
| <b>Applicable Statement of Work Paragraph</b>   |              |                                   |                  |   |  |                                |  |

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083L/WBS 007/new

## Work Breakdown Structure Dictionary

|  |                     |  |                         |  |  |  |
|--|---------------------|--|-------------------------|--|--|--|
| <b>WBS Level    4</b>  |                     |  |                         |  | <b>Contract Number<br/>NAS 8-35471</b>           |  |
| <b>Index Item No.    Life Sciences Program</b>   |                     |  |                         |  | <b>Contract Element</b>                          |  |
| <b>WBS Element/<br/>PMC    1.1.3</b>   |                     | <b>WBS Title<br/>Systems Effectiveness Engineering</b> |                         | <b>Contract Line Item:</b>   |  |  |
| <b>Date</b>  | <b>Revision No.</b> | <b>Revision Authority</b>                              | <b>Approved Changes</b> | <b>MPC/PMC</b>   |  |  |
| <b>Specification No.</b>   |                     | <b>Specification Title</b>                             |                         |  | <b>Cost Description<br/>Work order/Work Auth</b> |  |
| <b>Technical Content</b><br>The System Effectiveness Engineering element summarizes the system engineering required to define, control, and evaluate the system design and operation in terms of reliability, maintainability, quality assurance, human factors, parts, material and process control and standardization, and contamination and control. |                     |  |                         | <b>Cost Content-System Contractor</b><br>This element consists of Engineering Labor, Developmental Labor-Mechanical and Electrical, Developmental Material, Purchased Engineering, Production Labor-Mechanical, Production Material. |  |  |
| <b>Applicable Statement of Work Paragraph</b>  |                     |  |                         |  |  |  |

D483-10041-1

083L/WBS 008/R1

## Work Breakdown Structure Dictionary

|  |                     |                                    |                         |   |   |                                       |  |
|--|---------------------|------------------------------------|-------------------------|---|---|---------------------------------------|--|
| <b>Index Item No.</b> Life Sciences Program  |                     |                                    |                         |   | <b>WBS Level</b> 4                              | <b>Contract Number</b><br>NAS 8-35471 |  |
| <b>WBS Element/<br/>PMC</b> 1.1.4  |                     | <b>WBS Title</b><br>Systems Safety |                         | <b>Contract Element</b>   |   |                                       |  |
| <b>Date</b>  | <b>Revision No.</b> | <b>Revision Authority</b>          | <b>Approved Changes</b> | <b>Contract Line Item:</b>  |   |                                       |  |
| <b>Specification No.</b>   |                     | <b>Specification Title</b>         |                         | <b>MPC/PMC</b>  | <b>Cost Description</b><br>Work order/Work Auth |                                       |  |
| <b>Technical Content</b><br>The System Safety element consists of the activities associated with the elimination and/or control of accident potential which could lead to injury or loss of personnel and/or damage to flight or ground equipment throughout the complete cycle of the program. Included is Safety Management, System Safety Engineering and Industrial Safety tasks and coordination. |                     |                                    |                         | <b>Cost Content-System Contractor</b><br>This element consists of Engineering Labor, Health and Safety, Travel. |   |                                       |  |
| <b>Applicable Statement of Work Paragraph</b>  |                     |                                    |                         |   |   |                                       |  |

D483-10041-1

083L/WBS 009/new

| Work Breakdown Structure Dictionary  |              |                                 |                  |   |  | Contract Number<br>NAS 8-35471 |
|--|--------------|---------------------------------|------------------|---|--|--------------------------------|
| Index Item No. Life Sciences Program   |              |                                 |                  | WBS Level 3   |  |                                |
| WBS Element/<br>PMC 1.2  |              | WBS Title<br>Project Management |                  | Contract Element  |  |                                |
| Date   | Revision No. | Revision Authority              | Approved Changes |   |  |                                |
| Specification No.  |              | Specification Title             |                  | MPC/PMC   | Cost Description<br>Work order/Work Auth |                                |
| <b>Technical Content</b><br><br><b>Element Task Description</b><br><br><p>The Project Management element consists of the technical and administrative planning, organizing, directing, coordinating, controlling, and approval actions designed to accomplish overall program directives which are not associated with specific hardware elements and are not included in the system engineering/engineering element. Examples of these activities are configuration management, design to cost, manufacturing engineering, and studies related thereto.</p> <p>The lower elements are:</p> <ul style="list-style-type: none"> <li>1.2.1 - Cost/Schedules/Performance Management</li> <li>1.2.2 - Configuration Management</li> <li>1.2.3 - Data Information Management</li> <li>1.2.4 - Design to Cost</li> <li>1.2.5 - Engineering Supervision and Clerical</li> <li>1.2.6 - Quality Assurance</li> <li>1.2.7 - Manufacturing Engineering</li> </ul> <p>Applicable Statement of Work Paragraph</p> |              |                                 |                  | <b>Cost Content-System Contractor</b><br>For cost purposes this is a summary item only. |  |                                |

D483-10041-1

083LWBS 010/R1

|   |                     |  |                         |                            |  |                                       |  |
|---|---------------------|--|-------------------------|----------------------------|--|---------------------------------------|--|
| <b>Work Breakdown Structure Dictionary</b>  |                     |  |                         |                            |  | <b>Contract Number</b><br>NAS 8-35471 |  |
| <b>Index Item No.</b>   |                     | <b>Life Sciences Program</b>                             |                         |                            |  | <b>WBS Level</b> 4                    |  |
| <b>WBS Element/PMC</b> 1.2.1  |                     | <b>WBS Title</b><br>Cost/Schedule/Performance Management |                         | <b>Contract Line Item:</b> |  | <b>Contract Element</b>               |  |
| <b>Date</b>   | <b>Revision No.</b> | <b>Revision Authority</b>                                | <b>Approved Changes</b> |                            | <b>Cost Description</b><br>MPC/PMC<br><br><b>Cost Content-System Contractor</b><br>This element consists of Engineering. |                                       |  |
| <b>Specification No.</b>  |                     | <b>Specification Title</b>                               |                         |                            |  |                                       |  |
| <b>Technical Content</b><br>This element consists of an integrated performance management system which includes the integrated planning, scheduling, budgeting, work authorization and cost accumulation of all activities to be performed. This system provides program performance and measurement of progress thereto, and includes maintenance of project management plans, resource status reports, change controls, data summary analysis and procurement management. |                     |  |                         |                            |  |                                       |  |
| <b>Applicable Statement of Work Paragraph</b>   |                     |  |                         |                            |  |                                       |  |

# Work Breakdown Structure Dictionary

|  |              |                                       |                  |  |             |                  |                                |  |
|--|--------------|---------------------------------------|------------------|--|-------------|------------------|--------------------------------|--|
| Index Item No. Life Sciences Program   |              |                                       |                  |  | WBS Level 4 |                  | Contract Number<br>NAS 8-35471 |  |
| WBS Element/<br>PMC 1.2.2  |              | WBS Title<br>Configuration Management |                  | Contract Line Item:  |             | Contract Element |                                |  |
| Date   | Revision No. | Revision Authority                    | Approved Changes |  |             |                  |                                |  |
| Specification No.  |              | Specification Title                   |                  |  |             |                  |                                |  |
| <b>Technical Content</b><br>The Configuration Management element includes those tasks associated with the development and operation of a configuration management plan. The system is required to provide for the identification of configuration baselines, control and tracking of changes, status accountability, and verification of the system. Specific tasks include establishment and operation of a Configuration Change Control Board, handling of Engineering Change Proposals, preparation and maintenance of configuration status reports, preparation of Specification Change Notices and value engineering. |              |                                       |                  | <b>Cost Description</b><br>Work order/Work Auth  |             |                  |                                |  |
| <b>Applicable Statement of Work Paragraph</b>  |              |                                       |                  | <b>Cost Content-System Contractor</b><br>This element consists of Engineering, Labor, Developmental Labor - Electrical, Production Material, Outplant Labor. |             |                  |                                |  |

D483-10041-1

083LAWBS 012/new

| Work Breakdown Structure Dictionary  |              |  |                  |                                       |  | Contract Number<br>NAS 8-35471 |  |
|--|--------------|--|------------------|---------------------------------------|--|--------------------------------|--|
| Index Item No. Life Sciences Program   |              |  |                  | WBS Level 4                           |  | Contract Element               |  |
| WBS Element/<br>PMC 1.2.3  |              | WBS Title<br>Data Information Management |                  | Contract Line Item:                   |  |                                |  |
| Date   | Revision No. | Revision Authority                       | Approved Changes |                                       | Cost Description<br>Work order/Work Auth |                                |  |
| Specification No.  |              | Specification Title                      |                  | MPC/PMC                               |  |                                |  |
| <b>Technical Content</b><br>This element refers to the overall management process and activities required to ensure proper information and documentation flow and control. Included is the required information coordination, implementation and maintenance of the Data Management Plan and Procedures, subcontractor data acquisition, project level information file maintenance, and data preparation and submittal. |              |  |                  | <b>Cost Content-System Contractor</b> |  |                                |  |
| <b>Applicable Statement of Work Paragraph</b>  |              |  |                  |                                       |  |                                |  |

D483-10041-1

083L/WBS 013/new

| Work Breakdown Structure Dictionary  |                             |                    |  |           |  | Contract Number<br>NAS 8-35471 |
|--|-----------------------------|--------------------|--|-----------|--|--------------------------------|
| Index Item No. Life Sciences Program   |                             |                    |  | WBS Level | 4  |                                |
| WBS Element/<br>PMC 1.2.4  | WBS Title<br>Design to Cost |                    | Contract Line Item:  |           | Contract Element                         |                                |
| Date   | Revision No.                | Revision Authority | Approved Changes   |           |  |                                |
| Specification No.  | Specification Title         |                    | MPC/PMC  |           | Cost Description<br>Work order/Work Auth |                                |
| <b>Technical Content</b><br>This element includes the development and maintenance of a design-to-cost model and target based on cost, performance and schedule tradeoffs with prime emphasis on achieving the unit production cost goal and reducing the operations and support costs. |                             |                    | <b>Element Task Description</b><br>Cost Content-System Contractor<br>This element consists of Engineering Labor. |           |  |                                |
| <b>Applicable Statement of Work Paragraph</b>  |                             |                    |  |           |  |                                |



## Work Breakdown Structure Dictionary

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|---|--|---|--------------------|------------------|--|--|
| <b>Work Breakdown Structure Dictionary</b>  |  |   |                    |                  | Contract Number<br>NAS 8-35471   |  |
| Index Item No. Life Sciences Program  |  |   |                    | WBS Level 4      |  |  |
| WBS Element/<br>PMC 1.2.5   |  | WBS Title<br>Engineering Supervision and Clerical |                    |                  | Contract Element<br><br>Contract Line Item:  |  |
| Date  |  | Revision No.                                      | Revision Authority | Approved Changes |  |  |
| Specification No.   |  | Specification Title                               |                    |                  | MPC/PMC<br><br>Cost Description<br>Work order/Work Auth<br><br><br><br>Cost Content-System Contractor<br>This element consists of Engineering. |  |
| Element Task Description  |  |   |                    |                  |  |  |
| <p><b>Technical Content</b><br/>This element consists of all Engineering supervision and clerical labor.</p> <p><b>Applicable Statement of Work Paragraph</b></p> |  |   |                    |                  |  |  |

# Work Breakdown Structure Dictionary

| Work Breakdown Structure Dictionary  |                                |                    |                  |  | Contract Number<br>NAS 8-35471           |
|--|--------------------------------|--------------------|------------------|--|--|
| Index Item No. Life Sciences Program   |                                |                    |                  |  | WBS Level 4                              |
| WBS Element/<br>PMC 1.2.6  | WBS Title<br>Quality Assurance |                    |                  |  | Contract Element                         |
| Date   | Revision No.                   | Revision Authority | Approved Changes |  | Contract Line Item:                      |
| Specification No.  | Specification Title            |                    |                  |  | MPC/PMC                                  |
| <b>Technical Content</b><br>This element consists of the labor necessary to perform in-process inspections of fabricated end items maintaining product historical records and record usage and audit compliance with approved QA plans. Also included is the effort needed to perform design reviews to assure adequate acceptance criteria, and to review/approve purchase order documentation and manufacturing planning orders. |                                |                    |                  |  | Cost Description<br>Work order/Work Auth |
| <b>Applicable Statement of Work Paragraph</b><br>Cost Content-System Contractor<br>This element consists of Production Labor - Mechanical and Electrical Production Material.  |                                |                    |                  |  |  |

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| <b>Work Breakdown Structure Dictionary</b>  |                     |   |                         |   |                            | <b>Contract Number</b><br>NAS 8-35471 |  |
| <b>Index Item No.</b> Life Sciences Program   |                     |   |                         | <b>WBS Level</b> 4  |                            |                                       |  |
| <b>WBS Element/PMC</b> 1.2.7  |                     | <b>WBS Title</b><br>Manufacturing Engineering |                         | <b>Contract Element</b>   |                            |                                       |  |
| <b>Date</b>   | <b>Revision No.</b> | <b>Revision Authority</b>                     | <b>Approved Changes</b> |   | <b>Contract Line Item:</b> |                                       |  |
| <b>Specification No.</b>  |                     | <b>Specification Title</b>                    |                         | <b>MPC/PMC</b>  |                            |                                       |  |
| <b>Technical Content</b><br>This element includes the Manufacturing Engineering effort of planning, identification, analysis, and producibility of hardware. Included are production costs and schedules, trade studies, fabrication and assembly plans, facilities analysis for manufacturing needs, manufacturing development, support of the contract required reviews, and assessment of vendor capabilities. |                     | <b>Element Task Description</b>               |                         | <b>Cost Description</b><br>Work order/Work Auth   |                            |                                       |  |
| <b>Applicable Statement of Work Paragraph</b>   |                     |   |                         | <b>Cost Content-System Contractor</b><br>This element consists of Developmental Material, Production Labor - Mechanical and Electrical, Production Material |                            |                                       |  |

| Work Breakdown Structure Dictionary  |                     |                       |   |  |                     |  | Contract Number<br>NAS 8-35471 |
|--|---------------------|-----------------------|---|--|---------------------|--|--------------------------------|
| Index Item No.   |                     | Life Sciences Program |   |  | WBS Level 2         |  |                                |
| WBS Element/<br>PMC 2.0  | WBS Title<br>Data   |                       |   |  | Contract Element    |  |                                |
| Date   | Revision No.        | Revision Authority    | Approved Changes  |  | Contract Line Item: |  |                                |
| Specification No.  | Specification Title |                       |   |  | MPC/PMC             | Cost Description<br>Work order/Work Auth |                                |
| <b>Technical Content</b><br>The Data element refers to all deliverable data. The data requirements are selected from the Authorized Data List (ADL), and Index of Data Item Description. It also includes preparing company data, when required, into government format and the subsequent submittal thereof.<br><br>The lower level elements are:<br>2.1 - Technical Publications<br>2.2 - Engineering Data<br>2.3 - Support Data<br><br>Applicable Statement of Work Paragraph |                     |                       | <b>Cost Content-System Contractor</b><br>For cost purposes this is a summary item only. |  |                     |  |                                |

| Work Breakdown Structure Dictionary   |              |   |                  |  |                     | Contract Number<br>NAS 8-35471 |  |
|---|--------------|---|------------------|--|---------------------|--------------------------------|--|
| Index Item No.  |              | Life Sciences Program   |                  |  | WBS Level 3         |                                |  |
| WBS Element/<br>PMC 2.1   |              | WBS Title<br>Technical Publications                                       |                  | Contract Element   |                     |                                |  |
| Date  | Revision No. | Revision Authority  | Approved Changes |  | Contract Line Item: |                                |  |
| Specification No.   |              | Specification Title   |                  | MPC/PMC  |                     |                                |  |
| <b>Technical Content</b><br>The Technical Publications element includes the development of the module Support Equipment operation and maintenance data including procurements of commercial manuals. Maximum use will be made of existing data in an as-is format. Also included is the preparation of Technical Manuals and training and simulation manuals. |              | <b>Element Task Description</b><br>Applicable Statement of Work Paragraph |                  | <b>Cost Description</b><br>Work order/Work Auth<br><br>Cost Content-System Contractor<br>This element consists of Engineering Labor,<br>Developmental Labor - Developmental Material,<br>Production Labor - Production Material. |                     |                                |  |

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| <b>Work Breakdown Structure Dictionary</b>   |                     |                                      |                         |                            |   | <b>Contract Number</b><br>NAS 8-35471 |  |
| <b>Index Item No.</b>  |                     | <b>Life Sciences Program</b>         |                         | <b>WBS Level</b>           |   | <b>3</b>                              |  |
| <b>WBS Element/<br/>PMC 2.2</b>  |                     | <b>WBS Title</b><br>Engineering Data |                         | <b>Contract Line Item:</b> |   | <b>Contract Element</b>               |  |
| <b>Date</b>  | <b>Revision No.</b> | <b>Revision Authority</b>            | <b>Approved Changes</b> |                            | <b>MPC/PMC</b><br><br><b>Cost Description</b><br>Work order/Work Auth<br><br><b>Cost Content-System Contractor</b><br>This element consists of Engineering Labor, Developmental Labor - Mechanical and Electrical Developmental Material. |                                       |  |
| <b>Specification No.</b>   |                     | <b>Specification Title</b>           |                         |                            |   |                                       |  |
| <b>Technical Content</b><br>The Engineering Data element consists of those engineering drawings, associated lists, specifications, and other engineering documentation required by the Government. Included is the plan, procedures, reports, system and subsystem documentation, component engineering, testing, human factors, analysis, etc., in support of all engineering functions associated with the design, development, fabrication, test and operations of the Life Sciences Program. Also included are launch preparation procedures and ground support operations procedures and mission operations plan and procedures.<br><br><b>Applicable Statement of Work Paragraph</b> |                     |                                      |                         |                            |   |                                       |  |

D483-100411-1

083L/WBS 020/R2

| Work Breakdown Structure Dictionary   |                     |                           |                  |   |  |  | Contract Number<br>NAS 8-35471 |  |
|---|---------------------|---------------------------|------------------|---|--|--|--------------------------------|--|
| Index Item No. Life Sciences Program  |                     |                           |                  | WBS Level 3                                     |  |  |                                |  |
| WBS Element/<br>PMC 2.3   |                     | WBS Title<br>Support Data |                  |   |  |  | Contract Element               |  |
| Date  | Revision No.        | Revision Authority        | Approved Changes | Contract Line Item:                             |  |  |                                |  |
| Specification No.   | Specification Title |                           |                  | MPC/PMC   |  |  |                                |  |
| <b>Technical Content</b><br>The element consists of those data items designed to document the logistics support planning and provisioning processes. This element includes supply and general maintenance plans and reports, transportation, handling, packaging information etc., in support of SOW data requirements. |                     |                           |                  | <b>Cost Description</b><br>Work order/Work Auth |  |  |                                |  |
| <b>Applicable Statement of Work Paragraph</b>   |                     |                           |                  | <b>Cost Content-System Contractor</b>           |  |  |                                |  |

| Work Breakdown Structure Dictionary   |              |                                |                  |  |  | Contract Number<br>NAS 8-35471 |  |
|---|--------------|--------------------------------|------------------|--|--|--------------------------------|--|
| Index Item No. Life Sciences Program  |              |                                |                  | WBS Level 2  |  | Contract Element               |  |
| WBS Element/<br>PMC 3.0   |              | WBS Title<br>Ground Facilities |                  | Contract Line Item:                                  |  | Contract Element               |  |
| Date  | Revision No. | Revision Authority             | Approved Changes |  |  |                                |  |
| Specification No.   |              | Specification Title            |                  |  |  |                                |  |
| <b>Technical Content</b><br>The Ground Facilities element consists of the labor and material required to provide and maintain those ground facilities that are dedicated to the Life Sciences payload systems projects operations. The facilities are those required at the launch and recovery site. This element includes the special construction necessary to accommodate the dedicated ground facilities for the planned project operations. |              |                                |                  | <b>Cost Description</b><br>Work order/Work Auth      |  |                                |  |
| <b>Element Task Description</b><br><br>The lower elements are:<br>3.1 - Launch Processing<br>3.2 - Specimen support facility (launch site)<br>3.3 - Specimen support facility (recovery site)   |              |                                |                  | <b>MPC/PMC</b><br><br>Cost Content-System Contractor |  |                                |  |
| <b>Applicable Statement of Work Paragraph</b>   |              |                                |                  |  |  |                                |  |



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| <b>Work Breakdown Structure Dictionary</b>   |                     |  |                         |                            |  | <b>Contract Number</b><br>NAS 8-35471 |  |
| <b>Index Item No.</b>  |                     | <b>Life Sciences Program</b>   |                         |                            |  | <b>WBS Level</b> 3                    |  |
| <b>WBS Element/PMC</b> 3.1   |                     | <b>WBS Title</b><br>Launch Processing Facilities   |                         | <b>Contract Line Item:</b> |  | <b>Contract Element</b>               |  |
| <b>Date</b>  | <b>Revision No.</b> | <b>Revision Authority</b>  | <b>Approved Changes</b> |                            |  |                                       |  |
| <b>Specification No.</b>   |                     | <b>Specification Title</b>   |                         |                            |  |                                       |  |
| <b>Technical Content</b><br>The launch processing facilities element refers to the contract effort and material involved in providing the required facilities for launch processing of the LSRF modular element. |                     | <b>Element Task Description</b>  |                         |                            |  |                                       |  |
| <b>Applicable Statement of Work Paragraph</b>  |                     | <b>Cost Description</b><br>MPC/PMC<br>Work order/Work Auth<br><br>Cost Content-System Contractor |                         |                            |  |                                       |  |

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| <b>Work Breakdown Structure Dictionary</b>   |                     |   |                         |                            |   | <b>Contract Number</b><br>NAS 8-35471 |  |
| <b>Index Item No.</b> Life Sciences Program  |                     |   |                         |                            |   | <b>WBS Level</b> 3                    |  |
| <b>WBS Element/PMC</b> 3.2   |                     | <b>WBS Title</b><br>Specimen Support Facility (Launch Site) |                         | <b>Contract Line Item:</b> |   | <b>Contract Element</b>               |  |
| <b>Date</b>  | <b>Revision No.</b> | <b>Revision Authority</b>                                   | <b>Approved Changes</b> |                            | <b>MPC/PMC</b><br><br><b>Cost Description</b><br>Work order/Work Auth<br><br>Cost Content-System Contractor |                                       |  |
| <b>Specification No.</b>   |                     | <b>Specification Title</b>                                  |                         |                            |   |                                       |  |
| <b>Technical Content</b><br>The Specimen Support Facility (Launch Site) element contains all the labor and material required to design, develop, and construct special holding/test facilities for specimens/experiments including the required housing (brick and mortar), services for prime mission launch support requirements.<br><br><b>Applicable Statement of Work Paragraph</b> |                     |   |                         |                            |   |                                       |  |

| Work Breakdown Structure Dictionary  |  |                       |                                |                  |  | Contract Number<br>NAS 8-35471 |
|--|--|-----------------------|--------------------------------|------------------|--|--------------------------------|
| Index Item No.   |  | Life Sciences Program |                                | WBS Level 3      |  |                                |
| WBS Element/<br>PMC 3.3  | WBS Title<br>Specimen Support Facility (Recovery Site) | Contract Line Item:   |                                | Contract Element |  |                                |
| Date   | Revision No.   | Revision Authority    | Approved Changes               | MPC/PMC          | Cost Description<br>Work order/Work Auth |                                |
| Specification No.  | Specification Title                                    |                       | Cost Content-System Contractor |                  |  |                                |
| <b>Technical Content</b><br>The Specimen Support Facility (Recovery Site) element contains all the labor and material required to design, develop, and construct facilities (brick and mortar) for recovery of special holding and test equipment used for specimens and flight experiments. |  |                       |                                |                  |  |                                |
| <b>Applicable Statement of Work Paragraph</b>  |  |                       |                                |                  |  |                                |

# Work Breakdown Structure Dictionary

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|---|--------------|---------------------------------------|------------------|---|-------------|------------------|--------------------------------|--|
| Index Item No. Life Sciences Program  |              |                                       |                  |   | WBS Level 2 |                  | Contract Number<br>NAS 8-35471 |  |
| WBS Element/<br>PMC 4.0   |              | WBS Title<br>Ground Support Equipment |                  | Contract Line Item:   |             | Contract Element |                                |  |
| Date  | Revision No. | Revision Authority                    | Approved Changes |   |             |                  |                                |  |
| Specification No.   |              | Specification Title                   |                  |   | MPC/PMC     |                  |                                |  |
| <b>Technical Content</b><br>The Ground Support Equipment element task includes all material and labor required to design, develop, qualify, produce, test and deliver the ground support equipment used to support and maintain the Life Sciences Program. Included are vehicles, equipment and tools used to service, transport, hoist, repair, overhaul, assemble, disassemble, test, inspect or checkout the Life Sciences Module. |              |                                       |                  | <b>Cost Description</b><br>Work order/Work Auth<br><br>Cost Content-System Contractor<br>For cost purposes this element is a summary item only. |             |                  |                                |  |
| <b>Element Task Description</b><br><br>The lower elements are:<br>4.1 Electrical support equipment<br>4.2 Servicing equipment<br>4.3 Fixtures and stands<br>4.4 Contamination control<br>4.5 Handling equipment<br>4.6 Transporters<br>4.7 Storage and shipping<br>4.8 Support equipment tooling  |              |                                       |                  |   |             |                  |                                |  |

## Work Breakdown Structure Dictionary

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|---|---|----------------------------|-------------------------|---|--|--|--|
| <b>Index Item No. Life Sciences Program</b>   |   |                            |                         |   | <b>WBS Level 3</b>                               | <b>Contract Number<br/>NAS 8-35471</b> |  |
| <b>WBS Element/<br/>PMC 4.1</b>   | <b>WBS Title<br/>Electrical Support Equipment</b> |                            |                         | <b>Contract Element</b>   |  |  |  |
| <b>Date</b>   | <b>Revision No.</b>                               | <b>Revision Authority</b>  | <b>Approved Changes</b> | <b>Contract Line Item:</b>  |  |  |  |
| <b>Specification No.</b>  |   | <b>Specification Title</b> |                         | <b>MPC/PMC</b>  | <b>Cost Description<br/>Work order/Work Auth</b> |  |  |
| <b>Technical Content</b><br>The Electrical Support Equipment element includes the labor and material associated with the design, development, production, test, and sustaining effort of the electrical equipment required for operations and test support. |   |                            |                         | <b>Cost Content-System Contractor</b><br>This element consists of Engineering Labor, Developmental Labor - Mechanical and Electrical, Developmental Material, BCS, Production Labor - Electrical, Training, Purchased Equipment, Outside Production, Production Material. |  |  |  |
| <b>Applicable Statement of Work Paragraph</b>   |   |                            |                         |   |  |  |  |

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| <b>Work Breakdown Structure Dictionary</b>  |                     |   |                         |  |                            | <b>Contract Number</b><br>NAS 8-35471 |  |
| <b>Index Item No.</b> Life Sciences Program   |                     |   |                         | <b>WBS Level</b> 3   |                            |                                       |  |
| <b>WBS Element/PMC</b> 4.2  |                     | <b>WBS Title</b><br>Servicing Equipment |                         | <b>Contract Element</b>  |                            |                                       |  |
| <b>Date</b>   | <b>Revision No.</b> | <b>Revision Authority</b>               | <b>Approved Changes</b> |  | <b>Contract Line Item:</b> |                                       |  |
| <b>Specification No.</b>  |                     | <b>Specification Title</b>              |                         | <b>Cost Description</b><br>Work order/Work Auth  |                            |                                       |  |
| <b>Technical Content</b><br>The Servicing Equipment element includes the labor and material associated with the design, development, production, test and sustaining of the operations support servicing equipment. |                     |   |                         | <b>MPC/PMC</b><br><br><b>Cost Content-System Contractor</b><br>This element consists of Engineering Labor, Developmental Labor - Mechanical, Developmental Material, Production Labor - Mechanical and Electrical, Purchased Equipment, Outside Production, Production Material. |                            |                                       |  |
| <b>Applicable Statement of Work Paragraph</b>   |                     |   |                         |  |                            |                                       |  |

# Work Breakdown Structure Dictionary

|  |              |                                  |                  |  |             |                     |                                |  |
|--|--------------|----------------------------------|------------------|--|-------------|---------------------|--------------------------------|--|
| Index Item No. Life Sciences Program   |              |                                  |                  |  | WBS Level 3 |                     | Contract Number<br>NAS 8-35471 |  |
| WBS Element/<br>PMC 4.3  |              | WBS Title<br>Fixtures and Stands |                  | Contract Element   |             |                     |                                |  |
| Date   | Revision No. | Revision Authority               | Approved Changes |  |             | Contract Line Item: |                                |  |
| Specification No.  |              | Specification Title              |                  |  | MPC/PMC     |                     |                                |  |
| <b>Technical Content</b><br>This element includes the labor and material associated with the design, development, production, test, and sustaining of the fixture and stands required to support program operations. |              |                                  |                  | <b>Cost Description</b><br>Work order/Work Auth  |             |                     |                                |  |
| <b>Applicable Statement of Work Paragraph</b>  |              |                                  |                  | <b>Cost Content-System Contractor</b><br>This element consists of Production Labor - Mechanical and Electrical, Developmental Material, Outside Production, Production Material. |             |                     |                                |  |

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083L/WBS 029/new

# Work Breakdown Structure Dictionary

|   |              |                                    |                  |  |   |                  |                                |  |
|---|--------------|------------------------------------|------------------|--|---|------------------|--------------------------------|--|
| Index Item No. Life Sciences Program  |              |                                    |                  |  | WBS Level 3   |                  | Contract Number<br>NAS 8-35471 |  |
| WBS Element/<br>PMC 4.4   |              | WBS Title<br>Contamination Control |                  |  |   | Contract Element |                                |  |
| Date  | Revision No. | Revision Authority                 | Approved Changes |  | Contract Line Item:   |                  |                                |  |
| Specification No.   |              | Specification Title                |                  |  | MPC/PMC   |                  |                                |  |
| Technical Content   |              | Element Task Description           |                  |  | Cost Description  |                  |                                |  |
| <p>The Contamination Control element includes the labor and material associated with the design, development, production and test of the necessary program contamination control equipment.</p> <p>Applicable Statement of Work Paragraph</p> |              |                                    |                  |  | <p>Work order/Work Auth</p> <p>Cost Content--System Contractor</p> <p>This cost element consists of Production Labor - Mechanical, Outside Production, Production Material.</p> |                  |                                |  |



| Work Breakdown Structure Dictionary   |              |  |                  |  |                     | Contract Number<br>NAS 8-35471 |  |
|---|--------------|--|------------------|--|---------------------|--------------------------------|--|
| Index Item No.  |              | Life Sciences Program  |                  |  | WBS Level 3         |                                |  |
| WBS Element/<br>PMC 4.5   |              | WBS Title<br>Handling Equipment  |                  |  | Contract Element    |                                |  |
| Date  | Revision No. | Revision Authority   | Approved Changes |  | Contract Line Item: |                                |  |
| Specification No.   |              | Specification Title  |                  |  |                     | MPC/PMC                        |  |
| <b>Technical Content</b><br>The Handling Equipment element includes the labor and material associated with the design, development, production and test of the necessary program handling equipment, i.e., sling sets and assemblies, pallet dolly, etc.<br><br><b>Applicable Statement of Work Paragraph</b> |              | <b>Cost Description</b><br>Work order/Work Auth<br><br><b>Cost Content-System Contractor</b><br>This element consists of Production Material, Outside Production, Production Labor - Mechanical, Developmental Material. |                  |  |                     |                                |  |

| Work Breakdown Structure Dictionary   |                     |                           |   |                  |                     |  | Contract Number<br>NAS 8-35471 |
|---|---------------------|---------------------------|---|------------------|---------------------|--|--------------------------------|
| Index Item No.  |                     | Life Science Program      |   |                  | WBS Level 3         |  |                                |
| WBS Element/<br>PMC 4.6   |                     | WBS Title<br>Transporters |   | Contract Element |                     |  |                                |
| Date  | Revision No.        | Revision Authority        | Approved Changes  |                  | Contract Line Item: |  |                                |
| Specification No.   | Specification Title |                           | MPC/PMC   |                  |                     |  |                                |
| <b>Technical Content</b><br>The Transporter element includes the labor and material associated with the design, development, production, test and sustaining of the Life Sciences module transporters and handling equipment. |                     |                           | <b>Cost Description</b><br>Work order/Work Auth   |                  |                     |  |                                |
| <b>Applicable Statement of Work Paragraph</b>   |                     |                           | <b>Cost Content-System Contractor</b><br>This element consists of Engineering Labor, Production Labor - Mechanical, Developmental Labor - Mechanical, Purchased Equipment, Outside Production, Production Material. |                  |                     |  |                                |

## Work Breakdown Structure Dictionary

|   |   |                           |                         |   |  |  |
|---|---|---------------------------|-------------------------|---|--|--|
| <b>Index Item No. Life Sciences Program</b>   |   |                           |                         |   | <b>WBS Level 3</b>                               | <b>Contract Number<br/>NAS 8-35471</b> |
| <b>WBS Element/<br/>PMC 4.7</b>   | <b>WBS Title<br/>Storage and Shipping</b> |                           |                         | <b>Contract Element</b>   |  |  |
| <b>Date</b>   | <b>Revision No.</b>                       | <b>Revision Authority</b> | <b>Approved Changes</b> | <b>Contract Line Item:</b>  |  |  |
| <b>Specification No.</b>  | <b>Specification Title</b>                |                           |                         | <b>MPC/PMC</b>  | <b>Cost Description<br/>Work order/Work Auth</b> |  |
| <b>Technical Content</b><br>The Storage and Shipping element includes the labor and material associated with the design, development, production, and test for the required storage and shipping. |   |                           |                         | <b>Cost Content-System Contractor</b><br>This element consists of Production Labor - Mechanical, Developmental Labor - Mechanical, Production Material. |  |  |
| <b>Applicable Statement of Work Paragraph</b>   |   |                           |                         |   |  |  |

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083L/WBS 033/new

# Work Breakdown Structure Dictionary

|  |              |  |  |                  |  |  |                                |  |
|--|--------------|--|--|------------------|--|--|--------------------------------|--|
| Index Item No. Life Sciences Program   |              |  |  |                  | WBS Level 2  |  | Contract Number<br>NAS 8-35471 |  |
| WBS Element/<br>PMC 4.8  |              | WBS Title<br>Support Equipment Tooling |  |                  | Contract Element   |  |                                |  |
| Date   | Revision No. | Revision Authority                     |  | Approved Changes | Contract Line Item:  |  |                                |  |
| Specification No.  |              | Specification Title                    |  |                  | MPC/PMC  |  |                                |  |
| <b>Technical Content</b><br>This element includes the labor and material associated with the design, development, production, and test of the Life Sciences Program Support Equipment Tooling. |              |  |  |                  | <b>Cost Description</b><br>Work order/Work Auth  |  |                                |  |
| <b>Applicable Statement of Work Paragraph</b>  |              |  |  |                  | <b>Cost Content-System Contractor</b><br>This element consists of Production Labor - Electrical. |  |                                |  |

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083L/WBS 034/new

| Work Breakdown Structure Dictionary   |              |  |                  |  |  | Contract Number<br>NAS 8-35471 |
|---|--------------|--|------------------|--|--|--------------------------------|
| Index Item No.  |              | Life Sciences Program                    |                  | WBS Level 2  |  |                                |
| WBS Element/<br>PMC 5.0   |              | WBS Title<br>Life Sciences Module System |                  | Contract Element                                     |  |                                |
| Date  | Revision No. | Revision Authority                       | Approved Changes |  |  |                                |
| Specification No.   |              | Specification Title                      |                  |  |  |                                |
| <b>Technical Content</b><br>This element consists of the summary of all resources required to design, develop, produce, test, deliver and provide operations support for the Life Sciences Module System.<br><br>The lower level elements are:<br>5.1 - Space Station Common Module<br>5.2 - Integration and Assembly<br>5.3 - Life Sciences (non-human) Module Outfitting<br>5.4 - Life Sciences (human resources) Module Outfitting<br>5.5 - Attached Sciences Payload Accommodation<br><br><b>Applicable Statement of Work Paragraph</b> |              | <b>Element Task Description</b>          |                  | <b>MPC/PMC</b><br><br>Cost Content-System Contractor |  |                                |
|   |              |  |                  | <b>Cost Description</b><br>Work order/Work Auth      |  |                                |

|  |  |   |  |                                       |  |   |  |
|--|--|---|--|---------------------------------------|--|---|--|
| <b>Work Breakdown Structure Dictionary</b>   |  |   |  |                                       |  | <b>Contract Number</b><br>NAS 8-35471           |  |
| <b>Index Item No.</b>  |  | <b>Life Sciences Program</b>                    |  |                                       |  | <b>WBS Level</b> 3                              |  |
| <b>WBS Element/<br/>PMC 5.1</b>  |  | <b>WBS Title</b><br>Space Station Common Module |  |                                       |  | <b>Contract Element</b>                         |  |
| <b>Date</b>  |  | <b>Revision No.</b>                             |  | <b>Revision Authority</b>             |  | <b>Contract Line Item:</b>                      |  |
|  |  |   |  |                                       |  |   |  |
| <b>Specification No.</b>   |  | <b>Specification Title</b>                      |  |                                       |  | <b>Cost Description</b><br>Work order/Work Auth |  |
|  |  |   |  |                                       |  |   |  |
| <b>Technical Content</b><br>The Space Station Common Module element consists of all the requirements to interface with the existing phase "B" configuration. It includes the associated accommodation requirements for outfitting and configuring for manned and unmanned Life Sciences Module system. |  |   |  | <b>Cost Content-System Contractor</b> |  |   |  |
| <b>Applicable Statement of Work Paragraph</b>  |  |   |  |                                       |  |   |  |

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083L/WBS 036/new

## Work Breakdown Structure Dictionary

|  |   |                           |                         |  |  |  |  |
|--|---|---------------------------|-------------------------|--|--|--|--|
| <b>Index Item No. Life Science Program</b>   |   |                           |                         |  | <b>WBS Level 3</b>                               | <b>Contract Number<br/>NAS 8-35471</b> |  |
| <b>WBS Element/<br/>PMC 5.2</b>  | <b>WBS Title<br/>Integration and Assembly</b> |                           |                         |  | <b>Contract Element<br/>Contract Line Item:</b>  |  |  |
| <b>Date</b>  | <b>Revision No.</b>                           | <b>Revision Authority</b> | <b>Approved Changes</b> |  |  |  |  |
| <b>Specification No.</b>   | <b>Specification Title</b>                    |                           |                         |  | <b>Cost Description<br/>Work order/Work Auth</b> |  |  |
| <b>Element Task Description</b>  |   |                           |                         |  |  |  |  |
| <b>Technical Content</b><br>The Integration and Assembly element covers all life science equipment and hardware including design, modeling, and analyses required for outfitting in the common module. |   |                           |                         |  | <b>Cost Content-System Contractor</b>            |  |  |
| <b>Applicable Statement of Work Paragraph</b>  |   |                           |                         |  |  |  |  |

| Work Breakdown Structure Dictionary  |              |  |                  |   |             | Contract Number<br>NAS 8-35471 |  |
|--|--------------|--|------------------|---|-------------|--------------------------------|--|
| Index Item No.   |              | Life Sciences Program                                    |                  |   | WBS Level 3 |                                |  |
| WBS Element/<br>PMC 5.3  |              | WBS Title<br>Life Sciences (Non-Human) Module Outfitting |                  | Contract Line Item:   |             |                                |  |
| Date   | Revision No. | Revision Authority                                       | Approved Changes | Contract Element  |             |                                |  |
| Specification No.  |              | Specification Title                                      |                  | Cost Description  |             |                                |  |
| <b>Technical Content</b><br>The Life Science (non-human) Module Outfitting consists of providing provisions for the installation of the Life Science Research Facility Laboratory equipment in the common module, provisions for the addition of utility support subsystems, and the integration provisions of these hardware into an operating laboratory element.<br><br>The lower level elements are:<br>5.3.1 - Integration and Assembly<br>5.3.2 - Subsystems<br>5.3.3 - Distribution Utility Networks<br>5.3.4 - Laboratory Equipment<br><br><b>Applicable Statement of Work Paragraph</b> |              |  |                  | <b>MPC/PMC</b><br><br><b>Cost Content-System Contractor</b> |             |                                |  |
|  |              |  |                  | <b>Work order/Work Auth</b>                                 |             |                                |  |



# Work Breakdown Structure Dictionary

|   |              |                                       |                  |  |                                |  |                                |  |
|---|--------------|---------------------------------------|------------------|--|--------------------------------|--|--------------------------------|--|
| Index Item No. Life Sciences Program  |              |                                       |                  |  | WBS Level 4                    |  | Contract Number<br>NAS 8-35471 |  |
| WBS Element/<br>PMC 5.3.1   |              | WBS Title<br>Integration and Assembly |                  |  | Contract Element               |  |                                |  |
| Date  | Revision No. | Revision Authority                    | Approved Changes |  | Contract Line Item:            |  |                                |  |
| Specification No.   |              | Specification Title                   |                  |  | MPC/PMC                        |  |                                |  |
| Technical Content   |              | Element Task Description              |                  |  | Cost Description               |  |                                |  |
| The Life Science (Non-Human) Integration and Assembly element refers to the integration of the environmental subsystem, distribution utility networks, and laboratory equipment requirements for outfitting the common module as a (non-human) Life Science Module. |              |                                       |                  |  | Work order/Work Auth           |  |                                |  |
| Applicable Statement of Work Paragraph  |              |                                       |                  |  | Cost Content-System Contractor |  |                                |  |

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083L/WBS 040/new

# Work Breakdown Structure Dictionary

Contract Number  
NAS 8-35471

WBS Level 4

Index Item No. Life Sciences Program

Contract Element

Contract Line Item:

WBS Element/  
PMC 5.3.2

WBS Title  
Subsystems

Date

Revision No.

Revision Authority

Approved Changes

Specification No.

Specification Title

MPC/PMC

Cost Description

Work order/Work Auth

## Element Task Description

### Technical Content

The Subsystem element includes the labor and material required to design, develop, fabricate, and test environmental subsystems and equipment for outfitting of the life science module.

Lower level elements are:

- 5.3.2.1 - Integration and Assembly
- 5.3.2.2 - Structure and Mechanism
- 5.3.2.3 - Electrical Power
- 5.3.2.4 - Thermal Control
- 5.3.2.5 - Data Management
- 5.3.2.6 - ECLS
- 5.3.2.7 - Habitability/Man Systems

### Applicable Statement of Work Paragraph

# Work Breakdown Structure Dictionary

|  |              |                                       |                  |  |   |  |             |  |                                |  |
|--|--------------|---------------------------------------|------------------|--|---|--|-------------|--|--------------------------------|--|
| Index Item No.   |              |                                       |                  |  | Life Sciences Program   |  | WBS Level 5 |  | Contract Number<br>NAS 8-35471 |  |
| WBS Element/<br>PMC 5.3.2.1  |              | WBS Title<br>Integration and Assembly |                  |  | Contract Line Item:   |  |             | Contract Element                         |                                |  |
| Date   | Revision No. | Revision Authority                    | Approved Changes |  | MPC/PMC   |  |             | Cost Description<br>Work order/Work Auth |                                |  |
| Specification No.  |              | Specification Title                   |                  |  | <p><b>Cost Content-System Contractor</b><br/>This cost element consists of Engineering Labor, Production Labor - Electrical, Production Material and Purchased Equipment.</p> |  |             |  |                                |  |
| <p><b>Technical Content</b><br/>The Integration and Assembly element task includes the material and labor required for integrated installation, assembly and test of the other Level 5 elements (i.e. structures and mechanisms, electrical power, thermal control, data management and ECLS.)</p> |              |                                       |                  |  |   |  |             |  |                                |  |
| <p><b>Applicable Statement of Work Paragraph</b></p>   |              |                                       |                  |  |   |  |             |  |                                |  |

|  |                     |   |                         |  |                                       |  |
|--|---------------------|---|-------------------------|--|---------------------------------------|--|
| <b>Work Breakdown Structure Dictionary</b>   |                     |   |                         |  | <b>Contract Number</b><br>NAS 8-35471 |  |
| <b>Index Item No.</b> Life Sciences Program  |                     |   |                         |  | <b>WBS Level</b> 5                    |  |
| <b>WBS Element/</b><br>PMC 5.3.2.2   |                     | <b>WBS Title</b><br>Structures and Mechanisms |                         | <b>Contract Element</b>  |                                       |  |
| <b>Date</b>  | <b>Revision No.</b> | <b>Revision Authority</b>                     | <b>Approved Changes</b> |  | <b>Contract Line Item:</b>            |  |
| <b>Specification No.</b>   |                     | <b>Specification Title</b>                    |                         | <b>MPC/PMC</b>   |                                       |  |
| <b>Technical Content</b><br>This element includes the design, development, analysis, procedure development, report, qualification effort, production, test and delivery of the structural and mechanical components/subsystems required by the LRSF outfitting.<br><br><b>Applicable Statement of Work Paragraph</b> |                     |   |                         | <b>Cost Description</b><br>Work order/Work Auth<br><br><b>Cost Content-System Contractor</b><br>For cost purposes this is a summary item only. |                                       |  |

## Work Breakdown Structure Dictionary

|   |                     |                                      |                         |   |                                       |   |
|---|---------------------|--------------------------------------|-------------------------|---|---------------------------------------|---|
| <b>Work Breakdown Structure Dictionary</b>  |                     |                                      |                         |   | <b>Contract Number</b><br>NAS 8-35471 |   |
| <b>Index Item No.</b>   |                     | <b>Life Sciences Program</b>         |                         |   | <b>WBS Level</b> 5                    |   |
| <b>WBS Element/<br/>PMC 5.3.2.3</b>   |                     | <b>WBS Title</b><br>Electrical Power |                         | <b>Contract Element</b>   |                                       |   |
| <b>Date</b>   | <b>Revision No.</b> | <b>Revision Authority</b>            | <b>Approved Changes</b> |   | <b>Contract Line Item:</b>            |   |
| <b>Specification No.</b>  |                     | <b>Specification Title</b>           |                         |   | <b>MPC/PMC</b>                        | <b>Cost Description</b><br>Work order/Work Auth |
| <b>Technical Content</b><br>This element includes the design, development, analysis, procedure development, report, qualification effort, production, test and delivery of the electrical power components/subsystems required by the LSRF outfitting.<br><br><b>Applicable Statement of Work Paragraph</b> |                     |                                      |                         | <b>Cost Content-System Contractor</b><br>For cost purposes this is a summary item only. |                                       |   |

| Work Breakdown Structure Dictionary  |              |                              |                  |   |  | Contract Number<br>NAS 8-35471 |  |
|--|--------------|------------------------------|------------------|---|--|--------------------------------|--|
| Index Item No.   |              | Life Sciences Program        |                  | WBS Level   |  | 5                              |  |
| WBS Element/<br>PMC 5.3.2.4  |              | WBS Title<br>Thermal Control |                  | Contract Line Item:   |  | Contract Element               |  |
| Date   | Revision No. | Revision Authority           | Approved Changes |   |  |                                |  |
| Specification No.  |              | Specification Title          |                  | MPC/PMC   |  |                                |  |
| Technical Content  |              | Element Task Description     |                  | Cost Description<br>Work order/Work Auth  |  |                                |  |
| <p>Applicable Statement of Work Paragraph</p> <p>This element includes the design, development, analysis, procedure development, report, qualification effort, production, test and delivery of the thermal control components/subsystems required by LSRF outfitting.</p> |              |                              |                  | <p>Cost Content-System Contractor</p> <p>For cost purposes this is a summary item only.</p> |  |                                |  |

|   |                     |                                     |                         |  |  |                                       |  |
|---|---------------------|-------------------------------------|-------------------------|--|--|---------------------------------------|--|
| <b>Work Breakdown Structure Dictionary</b>  |                     |                                     |                         |  |  | <b>Contract Number</b><br>NAS 8-35471 |  |
| <b>Index Item No.</b> Life Sciences Program   |                     |                                     |                         | <b>WBS Level</b> 5   |  |                                       |  |
| <b>WBS Element/</b><br>PMC 5.3.2.5  |                     | <b>WBS Title</b><br>Data Management |                         | <b>Contract Element</b>  |  |                                       |  |
| <b>Date</b>   | <b>Revision No.</b> | <b>Revision Authority</b>           | <b>Approved Changes</b> | <b>Contract Line Item:</b>   |  |                                       |  |
| <b>Specification No.</b>  |                     | <b>Specification Title</b>          |                         | <b>MPC/PMC</b>   |  |                                       |  |
| <b>Technical Content</b><br>This element includes the design, development, analysis, procedure development, report, qualification effort, production, test and delivery of the data management components/subsystems required by the LSRF outfitting.<br><br>Applicable Statement of Work Paragraph |                     |                                     |                         | <b>Cost Description</b><br>Work order/Work Auth<br><br><b>Cost Content-System Contractor</b><br>For cost purposes this is a summary item only. |  |                                       |  |

| Work Breakdown Structure Dictionary  |              |                     |                  |   |  | Contract Number<br>NAS 8-35471 |  |
|--|--------------|---------------------|------------------|---|--|--------------------------------|--|
| Index Item No. Life Sciences Program   |              |                     |                  | WBS Level 5   |  | Contract Element               |  |
| WBS Element/<br>PMC 5.3.2.6  |              | WBS Title<br>ECLS   |                  | Contract Line Item:   |  | Contract Element               |  |
| Date   | Revision No. | Revision Authority  | Approved Changes |   |  |                                |  |
| Specification No.  |              | Specification Title |                  |   |  |                                |  |
| <b>Technical Content</b><br>This element includes the design, development, analysis, procedure development, report, qualification effort, production, test and delivery of the ECLS components/subsystems required by the LSRF outfitting. |              |                     |                  | <b>Cost Description</b><br>Work order/Work Auth   |  |                                |  |
| <b>Applicable Statement of Work Paragraph</b>  |              |                     |                  | <b>Cost Content-System Contractor</b><br>For cost purposes this is a summary item only. |  |                                |  |



## Work Breakdown Structure Dictionary

|  |   |                           |                         |   |  |  |
|--|---|---------------------------|-------------------------|---|--|--|
| <b>Index Item No. Life Sciences Program</b>  |   |                           |                         |   | <b>WBS Level 5</b>                               | <b>Contract Number<br/>NAS 8-35471</b> |
| <b>WBS Element/<br/>PMC 5.3.2.7</b>  | <b>WBS Title<br/>Habitability/Man Systems</b> |                           |                         | <b>Contract Element</b>   |  |  |
| <b>Date</b>  | <b>Revision No.</b>                           | <b>Revision Authority</b> | <b>Approved Changes</b> | <b>Contract Line Item:</b>  |  |  |
| <b>Specification No.</b>   | <b>Specification Title</b>                    |                           |                         | <b>MPC/PMC</b>  | <b>Cost Description<br/>Work order/Work Auth</b> |  |
| <b>Technical Content</b><br>This element includes the design, development, analysis, procedure development, report, qualification effort, production, test and delivery of the habitability/man systems components/subsystems required by the LSRF outfitting.<br><br>Applicable Statement of Work Paragraph |   |                           |                         | <b>Cost Content-System Contractor</b><br>For cost purposes this is a summary item only. |  |  |

# Work Breakdown Structure Dictionary

|  |  |  |  |                     |                       |                     |                    |                      |                                |  |
|--|--|--|--|---------------------|-----------------------|---------------------|--------------------|----------------------|--------------------------------|--|
| Index Item No.   |  |  |  |                     | Life Sciences Program |                     | WBS Level 4        |                      | Contract Number<br>NAS 8-35471 |  |
| WBS Element/<br>PMC 5.3.3  |  | WBS Title<br>Distribution Utility Networks |  |                     | Revision No.          |                     | Revision Authority |                      | Approved Changes               |  |
| Date   |  | Specification No.                          |  | Specification Title |                       | Contract Line Item: |                    | Contract Element     |                                |  |
| Technical Content  |  | Element Task Description                   |  | MPC/PMC             |                       | Cost Description    |                    | Work order/Work Auth |                                |  |
| <p>The Distribution Utility Networks of the life sciences program consists of the labor and materials required to design, develop, produce and test the mechanical and electrical interface requirements of the life science module outfitting with the common module.</p> <p>Lower level elements are:</p> <ul style="list-style-type: none"> <li>5.3.3.1 Integration and Assembly</li> <li>5.3.3.2 Mechanical Utility</li> <li>5.3.3.3 Electrical Utility</li> </ul> <p>Applicable Statement of Work Paragraph</p> |  | <p>Cost Content-System Contractor</p>      |  |                     |                       |                     |                    |                      |                                |  |

## Work Breakdown Structure Dictionary

|  |                     |  |                         |  |   |                                       |  |
|--|---------------------|--|-------------------------|--|---|---------------------------------------|--|
| <b>Index Item No.</b> Life Sciences Program  |                     |  |                         |  | <b>WBS Level</b> 5  | <b>Contract Number</b><br>NAS 8-35471 |  |
| <b>WBS Element/<br/>PMC 5.3.3.1</b>  |                     | <b>WBS Title</b><br>Integration and Assembly |                         |  | <b>Contract Element</b><br><br><b>Contract Line Item:</b> |                                       |  |
| <b>Date</b>  | <b>Revision No.</b> | <b>Revision Authority</b>                    | <b>Approved Changes</b> |  |   |                                       |  |
| <b>Specification No.</b>   |                     | <b>Specification Title</b>                   |                         |  | <b>Cost Description</b><br>Work order/Work Auth           |                                       |  |
| <b>Element Task Description</b>  |                     |  |                         |  |   |                                       |  |
| <p><b>Technical Content</b><br/>The Integration and Assembly element task includes the material and labor required for integrated installation, assembly and test of the other Level 5 elements (i.e. mechanical utility and electrical utility).</p> <p><b>Applicable Statement of Work Paragraph</b></p> |                     |  |                         |  |   |                                       |  |
| <p><b>MPC/PMC</b></p> <p><b>Cost Content-System Contractor</b><br/>This cost element consists of Engineering Labor, Production Labor - Electrical, Production Material and Purchased Equipment.</p>  |                     |  |                         |  |   |                                       |  |

| Work Breakdown Structure Dictionary   |              |  |                  |             |  |  | Contract Number<br>NAS 8-35471 |  |
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| Index Item No. Life Sciences Program  |              |  |                  | WBS Level 5 |  |  |                                |  |
| WBS Element/<br>PMC 5.3.3.2   |              | WBS Title<br>Mechanical Utility  |                  |             |  |  | Contract Element               |  |
| Date  | Revision No. | Revision Authority   | Approved Changes |             |  |  |                                |  |
| Specification No.   |              | Specification Title  |                  |             |  |  |                                |  |
| Technical Content   |              | Element Task Description   |                  |             |  |  |                                |  |
| <p>This element includes the design, development, analysis, procedure development, report, qualification effort, production, test and delivery of the mechanical utility components/subsystems required by the LSRF outfitting.</p> <p>Applicable Statement of Work Paragraph</p> |              | <p>MPC/PMC</p> <p>Cost Description<br/>Work order/Work Auth</p> <p>Cost Content-System Contractor<br/>For cost purposes this is a summary item only.</p> |                  |             |  |  |                                |  |

# Work Breakdown Structure Dictionary

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|--|--------------|--|------------------|------------------|--|--------------------------------|--|
| Index Item No. Life Sciences Program   |              |  |                  | WBS Level 5      |  | Contract Number<br>NAS 8-35471 |  |
| WBS Element/<br>PMC 5.3.3.3  |              | WBS Title<br>Electrical Utility  |                  | Contract Element |  |                                |  |
| Date   | Revision No. | Revision Authority   | Approved Changes |                  |  |                                |  |
| Specification No.  |              | Specification Title  |                  |                  |  |                                |  |
| <b>Technical Content</b><br>This element includes the design, development, analysis, procedure development, report, qualification effort, production, test and delivery of the electrical utility components/subsystems required by the LSRF outfitting.<br><br>Applicable Statement of Work Paragraph |              | <b>MPC/PMC</b><br><br><b>Cost Description</b><br>Work order/Work Auth<br><br><b>Cost Content-System Contractor</b><br>For cost purposes this is a summary item only. |                  |                  |  |                                |  |

| Work Breakdown Structure Dictionary  |              |                                   |                  |                  |  |             | Contract Number<br>NAS 8-35471           |  |
|--|--------------|-----------------------------------|------------------|------------------|--|-------------|--|--|
| Index Item No.   |              | Life Sciences Program             |                  |                  |  | WBS Level 4 |  |  |
| WBS Element/<br>PMC 5.3.4  |              | WBS Title<br>Laboratory Equipment |                  | Contract Element |  |             |  |  |
| Date   | Revision No. | Revision Authority                | Approved Changes |                  |  |             |  |  |
| Specification No.  |              | Specification Title               |                  |                  |  |             | Contract Line Item:                      |  |
| Technical Content  |              | Element Task Description          |                  |                  |  |             | MPC/PMC                                  |  |
| The Laboratory Equipment element for the Life Sciences program consists of the labor and materials for the design, development, installation and test of experiment equipment required for outfitting the common module. |              |                                   |                  |                  |  |             | Cost Description<br>Work order/Work Auth |  |
| Lower level elements are:  |              |                                   |                  |                  |  |             | Cost Content-System Contractor           |  |
| 5.3.4.1 Integration and Assembly   |              |                                   |                  |                  |  |             |  |  |
| 5.3.4.2 Specimen Holding Facilities  |              |                                   |                  |                  |  |             |  |  |
| 5.3.4.3 Specimen Research Centrifuge   |              |                                   |                  |                  |  |             |  |  |
| 5.3.4.4 Centrifuge Cage Units  |              |                                   |                  |                  |  |             |  |  |
| 5.3.4.5 Vestibular Research Facility   |              |                                   |                  |                  |  |             |  |  |
| 5.3.4.6 Common Holding Facility Support Equipment  |              |                                   |                  |                  |  |             |  |  |
| 5.3.4.7 Metabolic Monitoring System  |              |                                   |                  |                  |  |             |  |  |
| 5.3.4.8 Laboratory Equipment   |              |                                   |                  |                  |  |             |  |  |
| 5.3.4.9 Preservation Systems   |              |                                   |                  |                  |  |             |  |  |
| 5.3.4.10 Data Collection and Processing Systems  |              |                                   |                  |                  |  |             |  |  |
| 5.3.4.11 Bio-Instrumentation   |              |                                   |                  |                  |  |             |  |  |
| 5.3.4.12 Work Benches  |              |                                   |                  |                  |  |             |  |  |
| 5.3.4.13 Kits  |              |                                   |                  |                  |  |             |  |  |
| 5.3.4.14 Interface Equipment   |              |                                   |                  |                  |  |             |  |  |
| 5.3.4.15 Miscellaneous Equipment   |              |                                   |                  |                  |  |             |  |  |

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| Index Item No. Life Sciences Program  |              |                                       |                  |  | WBS Level 5  |  | Contract Number<br>NAS 8-35471 |  |
| WBS Element/<br>PMC 5.3.4.1   |              | WBS Title<br>Integration and Assembly |                  |  | Contract Element   |  |                                |  |
| Date  | Revision No. | Revision Authority                    | Approved Changes |  | Contract Line Item:  |  |                                |  |
| Specification No.   |              | Specification Title                   |                  |  | MPC/PMC  |  |                                |  |
| <b>Technical Content</b><br>The Integration and Assembly element task includes the material and labor required for integrated installation, assembly and test of the other Level 5 elements.<br><br><b>Applicable Statement of Work Paragraph</b> |              |                                       |                  |  | <b>Cost Description</b><br>Work order/Work Auth<br><br><b>Cost Content-System Contractor</b><br>This cost element consists of Engineering Labor, Production Labor - Electrical, Production Material and Purchased Equipment. |  |                                |  |

| Work Breakdown Structure Dictionary   |                     |  |                  |   |                  | Contract Number<br>NAS 8-35471 |  |
|---|---------------------|--|------------------|---|------------------|--------------------------------|--|
| Index Item No. Life Sciences Program  |                     |  |                  | WBS Level 5   |                  | Contract Element               |  |
| WBS Element/<br>PMC 5.3.4.2   |                     | WBS Title<br>Specimen Holding Facilities |                  | Contract Line Item:   |                  | Contract Element               |  |
| Date  | Revision No.        | Revision Authority                       | Approved Changes |   |                  |                                |  |
| Specification No.   | Specification Title |  |                  | MPC/PMC   | Cost Description | Work order/Work Auth           |  |
| <b>Technical Content</b><br>This element includes the design, development, analysis, procedure development, report, qualification effort, production, test and delivery of the specimen holding facilities components/subsystems required by the LSRF outfitting.<br><br>Applicable Statement of Work Paragraph |                     |  |                  | <b>Element Task Description</b><br><br>Cost Content-System Contractor<br>For cost purposes this is a summary item only. |                  |                                |  |



| Work Breakdown Structure Dictionary   |   |                       |   |             |                     | Contract Number<br>NAS 8-35471           |
|---|---|-----------------------|---|-------------|---------------------|--|
| Index Item No.  |   | Life Sciences Program |   | WBS Level 5 |                     |  |
| WBS Element/<br>PMC 5.3.4.3   | WBS Title<br>Specimen Research Centrifuge |                       |   |             |                     | Contract Element                         |
| Date  | Revision No.                              | Revision Authority    | Approved Changes  |             | Contract Line Item: |  |
| Specification No.   | Specification Title                       |                       | MPC/PMC   |             |                     | Cost Description<br>Work order/Work Auth |
| <b>Technical Content</b><br>This element includes the design, development, analysis, procedure development, report, qualification effort, production, test and delivery of the specimen research centrifuge components/subsystems required by the LSRF outfitting.<br><br><b>Applicable Statement of Work Paragraph</b> |   |                       | <b>Cost Content-System Contractor</b><br>For cost purposes this is a summary item only. |             |                     |  |

| Work Breakdown Structure Dictionary  |                     |                                    |                  |  |                     | Contract Number<br>NAS 8-35471 |  |
|--|---------------------|------------------------------------|------------------|--|---------------------|--------------------------------|--|
| Index Item No. Life Sciences Program   |                     |                                    |                  |  | WBS Level 5         |                                |  |
| WBS Element/<br>PMC 5.3.4.4  |                     | WBS Title<br>Centrifuge Cage Units |                  | Contract Element   |                     |                                |  |
| Date   | Revision No.        | Revision Authority                 | Approved Changes |  | Contract Line Item: |                                |  |
| Specification No.  | Specification Title |                                    |                  | MPC/PMC  |                     |                                |  |
| <b>Technical Content</b><br>This element includes the design, development, analysis, procedure development, report, qualification effort, production, test and delivery of the centrifuge cage units components/subsystems required by the LSRF outfitting.<br><br><b>Applicable Statement of Work Paragraph</b> |                     |                                    |                  | <b>Cost Description</b><br>Work order/Work Auth<br><br><b>Cost Content-System Contractor</b><br>For cost purposes this is a summary item only. |                     |                                |  |

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| Work Breakdown Structure Dictionary  |              |   |                  |                  |   |  | Contract Number<br>NAS 8-35471 |  |
|--|--------------|---|------------------|------------------|---|--|--------------------------------|--|
| Index Item No. Life Sciences Program   |              |   |                  | WBS Level 5      |   |  |                                |  |
| WBS Element/<br>PMC 5.3.4.5  |              | WBS Title<br>Vestibular Research Facility |                  | Contract Element |   |  |                                |  |
| Date   | Revision No. | Revision Authority                        | Approved Changes |                  |   |  |                                |  |
| Specification No.  |              | Specification Title                       |                  |                  | MPC/PMC   |  |                                |  |
| <b>Technical Content</b><br>This element includes the design, development, analysis, procedure development, report, qualification effort, production, test and delivery of the vestibular research facility components/subsystems required by the LSRF outfitting. |              | <b>Element Task Description</b>           |                  |                  | <b>Cost Description</b><br>Work order/Work Auth   |  |                                |  |
| <b>Applicable Statement of Work Paragraph</b>  |              |   |                  |                  | <b>Cost Content-System Contractor</b><br>For cost purposes this is a summary item only. |  |                                |  |

# Work Breakdown Structure Dictionary

|   |                     |   |                         |   |                            |  |                                       |  |
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| <b>Index Item No.</b> Life Sciences Program   |                     |   |                         |   | <b>WBS Level</b> 5         |  | <b>Contract Number</b><br>NAS 8-35471 |  |
| <b>WBS Element/<br/>PMC 5.3.4.6</b>   |                     | <b>WBS Title</b><br>Common Holding Facility Support Equipment |                         | <b>Contract Element</b>   |                            |  |                                       |  |
| <b>Date</b>   | <b>Revision No.</b> | <b>Revision Authority</b>                                     | <b>Approved Changes</b> |   | <b>Contract Line Item:</b> |  |                                       |  |
| <b>Specification No.</b>  |                     | <b>Specification Title</b>                                    |                         | <b>MPC/PMC</b>  |                            |  |                                       |  |
| <b>Technical Content</b><br>This element includes the design, development, analysis, procedure development, report, qualification effort, production, test and delivery of the common holding facility support equipment components/subsystems required by the LSRF outfitting. |                     | <b>Element Task Description</b>                               |                         | <b>Cost Description</b><br>Work order/Work Auth   |                            |  |                                       |  |
| <b>Applicable Statement of Work Paragraph</b>   |                     |   |                         | <b>Cost Content-System Contractor</b><br>For cost purposes this is a summary item only. |                            |  |                                       |  |

## Work Breakdown Structure Dictionary

|   |                     |  |                         |  |  |  |
|---|---------------------|--|-------------------------|--|--|--|
| <b>WBS Level 5</b>  |                     |  |                         |  | <b>Contract Number<br/>NAS 8-35471</b>   |  |
| <b>Index Item No. Life Sciences Program</b>   |                     |  |                         |  | <b>Contract Element</b>  |  |
| <b>WBS Element/<br/>PMC 5.3.4.7</b>   |                     | <b>WBS Title<br/>Metabolic Monitoring System</b> |                         |  | <b>Contract Line Item:</b>   |  |
| <b>Date</b>   | <b>Revision No.</b> | <b>Revision Authority</b>                        | <b>Approved Changes</b> |  | <b>Cost Description</b><br>Work order/Work Auth<br><br><b>MPC/PMC</b><br><br><b>Cost Content-System Contractor</b><br>For cost purposes this is a summary item only. |  |
| <b>Specification No.</b>  |                     | <b>Specification Title</b>                       |                         |  |  |  |
| <b>Element Task Description</b>   |                     |  |                         |  |  |  |
| <b>Technical Content</b><br>This element includes the design, development, analysis, procedure development, report, qualification effort, production, test and delivery of the metabolic monitoring system components/subsystems required by the LSRF outfitting. |                     |  |                         |  | <b>Cost Content-System Contractor</b><br>For cost purposes this is a summary item only.  |  |
| <b>Applicable Statement of Work Paragraph</b>   |                     |  |                         |  |  |  |

| Work Breakdown Structure Dictionary  |                                   |                       |   |  |  | Contract Number<br>NAS 8-35471 |
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| Index Item No.   |                                   | Life Sciences Program |   |  | WBS Level                                | 5                              |
| WBS Element/<br>PMC 5.3.4.8  | WBS Title<br>Laboratory Equipment |                       | Contract Element  |  | Contract Line Item:                      |                                |
| Date   | Revision No.                      | Revision Authority    | Approved Changes  |  |  |                                |
| Specification No.  | Specification Title               |                       | MPC/PMC   |  | Cost Description<br>Work order/Work Auth |                                |
| <b>Technical Content</b><br>This element includes the design, development, analysis, procedure development, report, qualification effort, production, test and delivery of the laboratory equipment components/subsystems required by the LSRF outfitting. |                                   |                       | <b>Cost Content-System Contractor</b><br>For cost purposes this is a summary item only. |  |  |                                |
| <b>Applicable Statement of Work Paragraph</b>  |                                   |                       |   |  |  |                                |

## Work Breakdown Structure Dictionary

|  |                     |  |                         |   |   |                                       |  |
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| <b>Index Item No.</b> Life Sciences Program  |                     |  |                         |   | <b>WBS Level</b> 5                              | <b>Contract Number</b><br>NAS 8-35471 |  |
| <b>WBS Element/<br/>PMC 5.3.4.9</b>  |                     | <b>WBS Title</b><br>Preservation Systems |                         | <b>Contract Element</b>   |   |                                       |  |
| <b>Date</b>  | <b>Revision No.</b> | <b>Revision Authority</b>                | <b>Approved Changes</b> | <b>Contract Line Item:</b>  |   |                                       |  |
| <b>Specification No.</b>   |                     | <b>Specification Title</b>               |                         | <b>MPC/PMC</b>  | <b>Cost Description</b><br>Work order/Work Auth |                                       |  |
| <b>Technical Content</b><br>This element includes the design, development, analysis, procedure development, report, qualification effort, production, test and delivery of the preservation system components/subsystems required by the LSRF outfitting.<br><br><b>Applicable Statement of Work Paragraph</b> |                     |  |                         | <b>Cost Content-System Contractor</b><br>For cost purposes this is a summary item only. |   |                                       |  |

| Work Breakdown Structure Dictionary   |   |                       |   |  |                     | Contract Number<br>NAS 8-35471 |
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| Index Item No.  |   | Life Sciences Program |   |  | WBS Level           | 5                              |
| WBS Element/<br>PMC 5.3.4.10  | WBS Title<br>Data Collection and Processing |                       |   |  | Contract Element    |                                |
| Date  | Revision No.                                | Revision Authority    | Approved Changes  |  | Contract Line Item: |                                |
| Specification No.   | Specification Title                         |                       | MPC/PMC   |  |                     |                                |
| <b>Technical Content</b><br>This element includes the design, development, analysis, procedure development, report, qualification effort, production, test and delivery of the data collected by the LSRF outfitting. |   |                       | <b>Cost Description</b><br>Work order/Work Auth   |  |                     |                                |
| <b>Applicable Statement of Work Paragraph</b>   |   |                       | <b>Cost Content-System Contractor</b><br>For cost purposes this is a summary item only. |  |                     |                                |



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| <b>Work Breakdown Structure Dictionary</b>  |              |                                  |                  |  |  | Contract Number<br>NAS 8-35471 |  |
| Index Item No. Life Sciences Program  |              |                                  |                  | WBS Level 5  |  |                                |  |
| WBS Element/<br>PMC 5.3.4.11  |              | WBS Title<br>Bio-Instrumentation |                  | Contract Element   |  |                                |  |
| Date  | Revision No. | Revision Authority               | Approved Changes |  |  |                                |  |
| Specification No.   |              | Specification Title              |                  |  |  |                                |  |
| <b>Technical Content</b><br>This element includes the design, development, analysis, procedure development, report, qualification effort, production, test and delivery of the Bio-instrumentation components/subsystems required by the LSRF outfitting. |              | <b>Element Task Description</b>  |                  | <b>MPC/PMC</b><br><br><b>Cost Description</b><br>Work order/Work Auth<br><br><b>Cost Content-System Contractor</b><br>For cost purposes this is a summary item only. |  |                                |  |
| <b>Applicable Statement of Work Paragraph</b>   |              |                                  |                  |  |  |                                |  |

## Work Breakdown Structure Dictionary

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| <b>Index Item No.</b> Life Sciences Program <b>WBS Level</b> 5   |                     |                                   |                         | <b>Contract Number</b><br>NAS 8-35471   |   |
| <b>WBS Element/<br/>PMC 5.3.4.12</b>   |                     | <b>WBS Title<br/>Work Benches</b> |                         | <b>Contract Element</b>   |   |
| <b>Date</b>  | <b>Revision No.</b> | <b>Revision Authority</b>         | <b>Approved Changes</b> | <b>Contract Line Item:</b>  |   |
| <b>Specification No.</b>   |                     | <b>Specification Title</b>        |                         | <b>MPC/PMC</b>  | <b>Cost Description</b><br>Work order/Work Auth |
| <b>Technical Content</b><br>This element includes the design, development, analysis, procedure development, report, qualification effort, production, test and delivery of the work benches components/subsystems required by the LSRF outfitting.<br><br>Applicable Statement of Work Paragraph |                     |                                   |                         | <b>Cost Content-System Contractor</b><br>For cost purposes this is a summary item only. |   |

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| Index Item No. Life Sciences Program   |              |                     |                  | WBS Level 5   |  | Contract Element               |  |
| WBS Element/<br>PMC 5.3.4.13   |              | WBS Title<br>Kits   |                  |   |  | Contract Line Item:            |  |
| Date   | Revision No. | Revision Authority  | Approved Changes |   |  |                                |  |
| Specification No.  |              | Specification Title |                  |   |  |                                |  |
| <b>Technical Content</b><br>This element includes the design, development, analysis, procedure development, report, qualification effort, production, test and delivery of the kits components/subsystems required by the LSRF outfitting. |              |                     |                  | <b>Cost Description</b><br>MPC/PMC<br>Work order/Work Auth                              |  |                                |  |
| <b>Applicable Statement of Work Paragraph</b>  |              |                     |                  | <b>Cost Content-System Contractor</b><br>For cost purposes this is a summary item only. |  |                                |  |

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| Index Item No. Life Sciences Program  |              |                                  |                  |   | WBS Level 5 |                  | Contract Number<br>NAS 8-35471 |  |
| WBS Element/<br>PMC 5.3.4.14  |              | WBS Title<br>Interface Equipment |                  |   |             | Contract Element |                                |  |
| Date  | Revision No. | Revision Authority               | Approved Changes |   |             |                  |                                |  |
| Specification No.   |              | Specification Title              |                  |   |             |                  |                                |  |
| <b>Technical Content</b><br>This element includes the design, development, analysis, procedure development, report, qualification effort, production, test and delivery of the interface equipment components/subsystems required by the LSRF outfitting. |              |                                  |                  | <b>Cost Description</b><br>Work order/Work Auth   |             |                  |                                |  |
| <b>Applicable Statement of Work Paragraph</b>   |              |                                  |                  | <b>Cost Content-System Contractor</b><br>For cost purposes this is a summary item only. |             |                  |                                |  |

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| <b>Work Breakdown Structure Dictionary</b>  |              |                                      |                  |  |  | Contract Number<br>NAS 8-35471 |  |
| Index Item No. Life Sciences Program  |              |                                      |                  | WBS Level 5  |  |                                |  |
| WBS Element/<br>PMC 5.3.4.15  |              | WBS Title<br>Miscellaneous Equipment |                  | Contract Element   |  |                                |  |
| Date  | Revision No. | Revision Authority                   | Approved Changes |  |  |                                |  |
| Specification No.   |              | Specification Title                  |                  |  |  |                                |  |
| <b>Technical Content</b><br>This element includes the design, development, analysis, procedure development, report, qualification effort, production, test and delivery of the miscellaneous equipment components/subsystems required by the LSRF outfitting. |              | <b>Element Task Description</b>      |                  | <b>MPC/PMC</b><br><br><b>Cost Description</b><br>Work order/Work Auth<br><br><b>Cost Content-System Contractor</b><br>For cost purposes this is a summary item only. |  |                                |  |
| <b>Applicable Statement of Work Paragraph</b>   |              |                                      |                  |  |  |                                |  |

| Work Breakdown Structure Dictionary  |   |                       |  |  |                     | Contract Number<br>NAS 8-35471 |
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| Index Item No.   |   | Life Sciences Program |  |  | WBS Level           | 3                              |
| WBS Element/<br>PMC 5.4  | WBS Title Life Sciences (Human Research)<br>Module Outfitting |                       |  |  | Contract Element    |                                |
| Date   | Revision No.  | Revision Authority    | Approved Changes                         |  | Contract Line Item: |                                |
| Specification No.  | Specification Title   |                       |  |  |                     |                                |
| <p><b>Technical Content</b></p> <p>The Life Sciences (human research) Module Outfitting consists of providing provisions for the installation of the human research facility laboratory equipment in the common module, provisions for the addition of utility support subsystems, and the integration provisions of these hardware into an operating laboratory element.</p> <p><b>Applicable Statement of Work Paragraph</b></p> |   |                       |  |  |                     |                                |
| MPC/PMC  |   |                       | Cost Description<br>Work order/Work Auth |  |                     |                                |
|  |   |                       | Cost Content-System Contractor           |  |                     |                                |

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|   |                     |   |                  |                                |                     |                                |  |
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| <b>Work Breakdown Structure Dictionary</b>  |                     |   |                  |                                |                     | Contract Number<br>NAS 8-35471 |  |
| Index Item No.  |                     | Life Science Program                                |                  |                                | WBS Level 3         |                                |  |
| WBS Element/<br>PMC 5.5   |                     | WBS Title<br>Attached Science Payload Accommodation |                  | Contract Element               |                     |                                |  |
| Date  | Revision No.        | Revision Authority                                  | Approved Changes |                                | Contract Line Item: |                                |  |
| Specification No.   | Specification Title |   |                  | MPC/PMC                        | Cost Description    | Work order/Work Auth           |  |
| <b>Technical Content</b><br>The Attached Science Payload Accommodation consists of a pressurized integrated element that is attached to the extension of a Life Sciences laboratory at a berthing port, on to a payload accommodation attachment on a Life Sciences module extension. |                     |   |                  | Cost Content-System Contractor |                     |                                |  |
| <b>Applicable Statement of Work Paragraph</b>   |                     |   |                  |                                |                     |                                |  |

| Work Breakdown Structure Dictionary  |                                |                       |   |                  |                      | Contract Number<br>NAS 8-35471 |
|--|--------------------------------|-----------------------|---|------------------|----------------------|--------------------------------|
| Index Item No.   |                                | Life Sciences Program |   | WBS Level 2      |                      |                                |
| WBS Element/<br>PMC 6.0  | WBS Title<br>Launch Operations |                       | Contract Line Item:   |                  | Contract Element     |                                |
| Date   | Revision No.                   | Revision Authority    | Approved Changes  |                  |                      |                                |
| Specification No.  | Specification Title            |                       | MPC/PMC   | Cost Description | Work order/Work Auth |                                |
| <b>Technical Content</b><br>This element consists of the effort required to prepare for and process the Life Sciences Research Facility, and integrate with STS cargo including countdown and launch. Included in this element is preparation of procedures and support to the Readiness Review. |                                |                       | <b>Cost Content-System Contractor</b><br>This element consists of Engineering Labor and Remote Labor. |                  |                      |                                |
| <b>Applicable Statement of Work Paragraph</b>  |                                |                       |   |                  |                      |                                |

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083L/WBS 045/R2



## Work Breakdown Structure Dictionary

|   |   |                           |                         |  |                                |  |  |
|---|---|---------------------------|-------------------------|--|--------------------------------|--|--|
| <b>Index Item No. Life Sciences Program</b>   |   |                           |                         |  | <b>WBS Level 3</b>             | <b>Contract Number<br/>NAS 8-35471</b>           |  |
| <b>WBS Element/<br/>PMC 6.1</b>   | <b>WBS Title<br/>Pre-Launch Preparation</b> |                           |                         |  | <b>Contract Element</b>        |  |  |
| <b>Date</b>   | <b>Revision No.</b>                         | <b>Revision Authority</b> | <b>Approved Changes</b> |  | <b>Contract Line Item:</b>     |  |  |
| <b>Specification No.</b>  | <b>Specification Title</b>                  |                           |                         |  | <b>MPC/PMC</b>                 | <b>Cost Description<br/>Work order/Work Auth</b> |  |
| <b>Technical Content</b><br>Pre-Launch Preparation element refers to all contractor effort and materials to conduct equipment receiving and checkout of the Life Science Module at the launch site, preflight assembly and checkout, transportation of equipments at the launch site. Support for pre-flight data reduction and analysis. |   |                           |                         |  | Cost Content-System Contractor |  |  |
| <b>Applicable Statement of Work Paragraph</b>   |   |                           |                         |  |                                |  |  |

## Work Breakdown Structure Dictionary

|  |                                     |                           |                         |  |                            |  |
|--|-------------------------------------|---------------------------|-------------------------|--|----------------------------|--|
| <b>Index Item No. Life Sciences Program</b>  |                                     |                           |                         |  | <b>WBS Level 3</b>         | <b>Contract Number<br/>NAS 8-35471</b> |
| <b>WBS Element/<br/>PMC 6.2</b>  | <b>WBS Title<br/>Launch Support</b> |                           |                         |  | <b>Contract Element</b>    |  |
| <b>Date</b>  | <b>Revision No.</b>                 | <b>Revision Authority</b> | <b>Approved Changes</b> |  | <b>Contract Line Item:</b> |  |
| <b>Specification No.</b>   | <b>Specification Title</b>          |                           |                         |  |                            |  |
| <div style="display: flex; justify-content: space-between;"> <div style="width: 30%;"> <p><b>Technical Content</b></p> <p>Launch Support for the Life Sciences Module includes the effort and material required to perform ground command, control, logistics support for launch, launch operations, telemetry, data analysis, and logistics support for ground equipment required for launch.</p> <p>Applicable Statement of Work Paragraph</p> </div> <div style="width: 30%; text-align: center;"> <p><b>Element Task Description</b></p> </div> <div style="width: 35%;"> <p><b>MPC/PMC</b></p> <p>Cost Description<br/>Work order/Work Auth</p> <p>Cost Content-System Contractor</p> </div> </div> |                                     |                           |                         |  |                            |  |

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| <b>Work Breakdown Structure Dictionary</b> |              |   |                  |  | Contract Number<br>NAS 8-35471 |  |
| Index Item No.                             |              | Life Sciences Program   |                  |  | WBS Level 2                    |  |
| WBS Element/<br>PMC 7.0                    |              | WBS Title<br>Initial Spares and Repair Parts  |                  |  | Contract Element               |  |
| Date                                       | Revision No. | Revision Authority  | Approved Changes |  | Contract Line Item:            |  |
| Specification No.                          |              | Specification Title   |                  |  | MPC/PMC                        |  |
| Technical Content                          |              | <p>Element Task Description</p> <p>The Initial Spares and Repair Parts element refers to the effort to establish spare requirements for the Life Sciences Module for flight. It also includes the initial procurement of spares and repair parts during the manufacturing phase for replacement purposes in major end items of equipments.</p> <p>The lower level elements are:</p> <p>Applicable Statement of Work Paragraph</p> |                  |  |                                |  |
|  |              | Cost Description<br>Work order/Work Auth  |                  |  |                                |  |
|  |              | Cost Content-System Contractor  |                  |  |                                |  |

## Work Breakdown Structure Dictionary

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|---|--|--|--------------------|------------------|---|---|
| <b>Work Breakdown Structure Dictionary</b>  |  |  |                    |                  | Contract Number<br>NAS 8-35471              |   |
| Index Item No.   Life Sciences Program  |  |  | WBS Level   2      |                  | Contract Element<br><br>Contract Line Item: |   |
| WBS Element/<br>PMC   8.0   |  | WBS Title<br>Logistics Support/Outfitting  |                    |                  |   |   |
| Date  |  | Revision No.   | Revision Authority | Approved Changes |   |   |
| Specification No.   |  | Specification Title  |                    |                  |   |   |
| <b>Technical Content</b><br>The Logistics Support/Outfitting element covers the integrated support of the logistics requirements and needs associated with transport of live specimens, consumables and waste materials, maintenance and repair parts, configuration change equipment processing, pre-/post-mission specimen and biological sample care for the Life Sciences Module. |  | <b>Element Task Description</b><br><br>The lower level elements are:<br>8.1 - Live Specimen Transporter<br>8.2 - Consumable and Waste Support<br>8.3 - Maintenance and Repair Parts<br>8.4 - Configuration Change Equipment Processing<br>8.5 - Pre-Mission and Post-Mission Specimen and Biological Sample Care |                    |                  |   | MPC/PMC<br><br><br>Cost Description<br>Work order/Work Auth<br><br>Cost Content-System Contractor |
| <b>Applicable Statement of Work Paragraph</b>   |  |  |                    |                  |   |   |

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| <b>Work Breakdown Structure Dictionary</b>   |              |   |                  |  |  | Contract Number<br>NAS 8-35471 |  |
| Index Item No.   |              | Life Sciences Program                   |                  |  |  | WBS Level 3                    |  |
| WBS Element/<br>PMC 8.1  |              | WBS Title<br>Life Specimen Transporter  |                  |  |  | Contract Element               |  |
| Date   | Revision No. | Revision Authority                      | Approved Changes |  |  |                                |  |
| Specification No.  |              | Specification Title                     |                  |  |  |                                |  |
| <b>Technical Content</b><br>The Live Specimen Transporter element includes the labor and material associated with the design, development, production, test and sustaining effort for the specimen transporters and handling equipment.<br><br>The lower level elements are:<br>8.1.1 Integration and Assembly<br>8.1.2 ECLS<br>8.1.3 Electrical<br>8.1.4 Specimen Holding Facility<br>8.1.5 Structures and Mechanisms<br><br>Applicable Statement of Work Paragraph |              | <b>Element Task Description</b><br><br> |                  | MPC/PMC<br><br>Cost Description<br>Work order/Work Auth<br><br>Cost Content--System Contractor |  |                                |  |

| Work Breakdown Structure Dictionary   |              |                                       |                  |   |                     | Contract Number<br>NAS 8-35471 |  |
|---|--------------|---------------------------------------|------------------|---|---------------------|--------------------------------|--|
| Index Item No. Life Sciences Program  |              |                                       |                  |   | WBS Level 4         |                                |  |
| WBS Element/<br>PMC 8.1.1   |              | WBS Title<br>Integration and Assembly |                  |   | Contract Element    |                                |  |
| Date  | Revision No. | Revision Authority                    | Approved Changes |   | Contract Line Item: |                                |  |
| Specification No.   |              | Specification Title                   |                  | MPC/PMC   |                     |                                |  |
| <b>Technical Content</b><br>The Live Specimen Transporter Integration and Assembly element refers to the integration of the ECLS, Electrical, Specimen Holding Facility, Structures and Mechanisms required for pre-launch and post-launch of live specimens. |              |                                       |                  | <b>Cost Description</b><br>Work order/Work Auth |                     |                                |  |
| <b>Applicable Statement of Work Paragraph</b>   |              |                                       |                  | <b>Cost Content-System Contractor</b>           |                     |                                |  |

## Work Breakdown Structure Dictionary

Contract Number  
NAS 8-35471

WBS Level 4

Index Item No. Life Sciences Program

WBS Element/  
PMC 8.1.2

WBS Title  
ECLS

Contract Element

Contract Line Item:

Date

Revision No.

Revision Authority

Approved Changes

Specification No.

Specification Title

MPC/PMC

Cost Description

Work order/Work Auth

Technical Content

Element Task Description

This element includes the effort required for the Environmental Control and Life Support functions that support the operations of the live specimen transporter, live specimen transfer from the ground to the Space Station and return of the live specimens in the logistics module.

Applicable Statement of Work Paragraph

Cost Content-System Contractor

## Work Breakdown Structure Dictionary

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| <b>Work Breakdown Structure Dictionary</b>   |  |  |             |                    | Contract Number<br>NAS 8-35471              |                  |  |
| Index Item No. Life Sciences Program   |  |  | WBS Level 4 |                    | Contract Element<br><br>Contract Line Item: |                  |  |
| WBS Element/<br>PMC 8.1.3  |  | WBS Title<br>Electrical                  |             |                    |   |                  |  |
| Date   |  | Revision No.                             |             | Revision Authority |   | Approved Changes |  |
| Specification No.  |  | Specification Title                      |             |                    |   |                  |  |
| Technical Content<br>This element includes the effort required for the Electrical Power and Control functions that support the operation of the live specimen transporter from the ground to the Space Station and return in the logistics module. |  | Element Task Description                 |             |                    |   |                  |  |
| Applicable Statement of Work Paragraph   |  |  |             |                    |   |                  |  |
| MPC/PMC  |  | Cost Description<br>Work order/Work Auth |             |                    |   |                  |  |
| Cost Content-System Contractor   |  |  |             |                    |   |                  |  |



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| <b>Work Breakdown Structure Dictionary</b>   |                     |   |                         |   |  | <b>Contract Number</b><br>NAS 8-35471 |  |
| <b>Index Item No.</b> Life Sciences Program  |                     |   |                         | <b>WBS Level</b> 4                              |  |                                       |  |
| <b>WBS Element/PMC</b> 8.1.4   |                     | <b>WBS Title</b><br>Specimen Holding Facility |                         | <b>Contract Element</b>                         |  |                                       |  |
| <b>Date</b>  | <b>Revision No.</b> | <b>Revision Authority</b>                     | <b>Approved Changes</b> | <b>Contract Line Item:</b>                      |  |                                       |  |
| <b>Specification No.</b>   |                     | <b>Specification Title</b>                    |                         | <b>MPC/PMC</b>                                  |  |                                       |  |
| <b>Technical Content</b><br>This element includes the effort required for the immediate live specimen holding enclosure provided for live specimen containment and including all of the life support interfaces. |                     | <b>Element Task Description</b>               |                         | <b>Cost Description</b><br>Work order/Work Auth |  |                                       |  |
| <b>Applicable Statement of Work Paragraph</b>  |                     |   |                         | <b>Cost Content-System Contractor</b>           |  |                                       |  |

| Work Breakdown Structure Dictionary   |  |                       |  |           | Contract Number<br>NAS 8-35471 |
|---|--|-----------------------|--|-----------|--------------------------------|
| Index Item No.  |  | Life Sciences Program |  | WBS Level | 4                              |
| WBS Element/<br>PMC 8.1.5   | WBS Title<br>Structures and Mechanisms |                       | Contract Element                         |           |                                |
| Date  | Revision No.                           | Revision Authority    | Contract Line Item:                      |           |                                |
|   |  |                       | Approved Changes                         |           |                                |
| Specification No.   | Specification Title                    |                       | MPC/PMC                                  |           |                                |
| <b>Technical Content</b><br>This element includes the effort required for the design, development, and test of the Structures and Mechanism hardware/activities for the Live Specimen Transporter used to transport live specimens to the Space Station and return in the logistics module. |  |                       | Cost Description<br>Work order/Work Auth |           |                                |
| <b>Applicable Statement of Work Paragraph</b>   |  |                       | Cost Content-System Contractor           |           |                                |

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| <b>Work Breakdown Structure Dictionary</b>  |  |  |  |   |  | <b>Contract Number</b><br>NAS 8-35471 |  |
| <b>Index Item No.</b> Life Sciences Program   |  |  |  | <b>WBS Level</b> 3                              |  |                                       |  |
| <b>WBS Element/PMC</b> 8.2  |  | <b>WBS Title</b><br>Consumable and Waste Support |  | <b>Contract Element</b>                         |  |                                       |  |
| <b>Date</b>   |  | <b>Revision No.</b>                              |  | <b>Revision Authority</b>                       |  | <b>Approved Changes</b>               |  |
| <b>Specification No.</b>  |  | <b>Specification Title</b>                       |  | <b>Contract Line Item:</b>                      |  |                                       |  |
|   |  |  |  | <b>MPC/PMC</b>                                  |  |                                       |  |
|   |  |  |  | <b>Cost Description</b><br>Work order/Work Auth |  |                                       |  |
|   |  |  |  | <b>Cost Content-System Contractor</b>           |  |                                       |  |
| <b>Technical Content</b><br>The Consumable and Waste Support element of the logistics support/outfitting of the Life Science program consists of the effort to maintain supply and disposal of waste for the life science module and facility. It includes the provisioning and inventory management, preservation, packaging and transportation. |  |  |  |   |  |                                       |  |
| <b>Applicable Statement of Work Paragraph</b>   |  |  |  |   |  |                                       |  |

## Work Breakdown Structure Dictionary

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| <b>Work Breakdown Structure Dictionary</b>   |  |   |                    |  | Contract Number<br>NAS 8-35471 |  |
| Index Item No.   |  | Life Sciences Program                     |                    |  | WBS Level    3                 |  |
| WBS Element/<br>PMC    8.3   |  | WBS Title<br>Maintenance and Repair Parts |                    | Contract Element                         |                                |  |
| Date   |  | Revision No.                              | Revision Authority | Approved Changes                         | Contract Line Item:            |  |
| Specification No.  |  | Specification Title                       |                    | MPC/PMC                                  |                                |  |
| <b>Technical Content</b><br>The Maintenance and Repair Parts element consists of the labor and material requirements and inventory of repair parts required to support the logistics of the life science module, facilities, and support equipment. Also, included are the maintenance and services contracts with suppliers of hardware end items required by the Life Science Program. |  | <b>Element Task Description</b>           |                    | Cost Description<br>Work order/Work Auth |                                |  |
| <b>Applicable Statement of Work Paragraph</b>  |  |   |                    | Cost Content--System Contractor          |                                |  |

| Work Breakdown Structure Dictionary  |              |  |                  |  |             | Contract Number<br>NAS 8-35471 |  |
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| Index Item No. Life Sciences Program   |              |  |                  |  | WBS Level 3 |                                |  |
| WBS Element/<br>PMC 8.4  |              | WBS Title<br>Configuration Change Equipment Processing |                  | Contract Element                         |             |                                |  |
| Date   | Revision No. | Revision Authority                                     | Approved Changes | Contract Line Item:                      |             |                                |  |
| Specification No.  |              | Specification Title                                    |                  | MPC/PMC                                  |             |                                |  |
| Technical Content<br>This element includes the effort for the preparation and processing of the Life Science Research Facility Configuration Change Equipment that is used to transport to and from the Space Station in the Space Station Logistics Module. |              | Element Task Description                               |                  | Cost Description<br>Work order/Work Auth |             |                                |  |
| Applicable Statement of Work Paragraph   |              |  |                  | Cost Content-System Contractor           |             |                                |  |

## Work Breakdown Structure Dictionary

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| <b>Index Item No. Life Sciences Program</b>  |   |                           |                         | <b>WBS Level 3</b>      | <b>Contract Number<br/>NAS 8-35471</b>  |
| <b>WBS Element/<br/>PMC 8.5</b>  | <b>WBS Title Pre-Mission and Post-Mission<br/>Specimen and Biological Sample Care</b> |                           |                         | <b>Contract Element</b> | <div style="display: flex; justify-content: space-between;"> <div style="width: 45%;"> <b>Contract Line Item:</b> </div> <div style="width: 45%;"> <b>Cost Description</b><br/>                     Work order/Work Auth                 </div> </div> <div style="margin-top: 10px;"> <b>MPC/PMC</b> </div> <div style="margin-top: 10px;"> <b>Cost Content-System Contractor</b> </div> |
| <b>Date</b>  | <b>Revision No.</b>   | <b>Revision Authority</b> | <b>Approved Changes</b> |                         |   |
| <b>Specification No.</b>   | <b>Specification Title</b>  |                           |                         |                         |   |
| <div style="display: flex;"> <div style="width: 30%; border-right: 1px solid black; padding-right: 5px;"> <b>Technical Content</b><br/>                     This element includes the effort required for the operation of the specimen and biological sample storage facility. Also, for the performance of the logistics functions associated with Pre-Mission and Post-Mission Specimen and Biological Sample Care.                 </div> <div style="width: 70%; padding-left: 5px;"> <b>Element Task Description</b><br/><br/> <div style="border: 1px solid black; height: 150px; margin-top: 10px;"></div> </div> </div> |   |                           |                         |                         |   |
| <b>Applicable Statement of Work Paragraph</b>  |   |                           |                         |                         |   |

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## Work Breakdown Structure Dictionary

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| <b>Index Item No. Life Sciences Program</b>   |  |                           |                         |  | <b>WBS Level 2</b>         | <b>Contract Number<br/>NAS 8-35471</b> |
| <b>WBS Element/<br/>PMC 9.0</b>   | <b>WBS Title<br/>Systems Test and Evaluation</b> |                           |                         |  | <b>Contract Element</b>    |  |
| <b>Date</b>   | <b>Revision No.</b>                              | <b>Revision Authority</b> | <b>Approved Changes</b> |  | <b>Contract Line Item:</b> |  |
| <b>Specification No.</b>  | <b>Specification Title</b>                       |                           |                         |  |                            | <b>Cost Description</b>                |
| <b>Technical Content</b><br>This element summarizes lower tier tasks which include the use of prototype, production, or specially fabricated hardware to obtain or validate engineering data on the performance of the space system or individual level 1 elements. System Integration Lab (SIL) activation and support tasks are included. |  |                           |                         |  |                            | <b>MPC/PMC</b>                         |
| <b>Element Task Description</b><br><br>The lower level elements are:<br>9.1 - Development Test and Evaluation<br>9.2 - Mockups/Simulators<br>9.3 - Test and Evaluation Support<br>9.4 - Test Facilities   |  |                           |                         |  |                            | <b>Work order/Work Auth</b>            |
| <b>Applicable Statement of Work Paragraph</b>   |  |                           |                         |  |                            |  |

| Work Breakdown Structure Dictionary  |              |  |                  |   |  | Contract Number<br>NAS 8-35471 |  |
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| Index Item No. Life Sciences Program   |              |  |                  | WBS Level 3   |  |                                |  |
| WBS Element/<br>PMC 9.1  |              | WBS Title<br>Development Test and Evaluation |                  | Contract Line Item:   |  |                                |  |
| Date   | Revision No. | Revision Authority                           | Approved Changes | Contract Element  |  |                                |  |
| Specification No.  |              | Specification Title                          |                  | Contract Element  |  |                                |  |
| <b>Technical Content</b><br>The Development Test and Evaluation element task includes the test and evaluation required to demonstrate completion of engineering design and development, system specification demonstration, evaluation of engineering design for operational use, and providing test data with which to examine and evaluate tradeoffs against specification requirements and schedules. |              |  |                  | <b>MPC/PMC</b><br><b>Cost Description</b><br>Work order/Work Auth                       |  |                                |  |
| The lower level elements are:<br>9.1.1 - System Tests<br>9.1.2 - System Segment Tests  |              |  |                  | <b>Cost Content-System Contractor</b><br>For cost purposes this is a summary item only. |  |                                |  |
| Applicable Statement of Work Paragraph   |              |  |                  |   |  |                                |  |



## Work Breakdown Structure Dictionary

|   |                                  |                           |                         |   |   |                                       |
|---|----------------------------------|---------------------------|-------------------------|---|---|---------------------------------------|
| <b>Index Item No.</b> <b>Life Sciences Program</b>  |                                  |                           |                         |   | <b>WBS Level</b> 4                              | <b>Contract Number</b><br>NAS 8-35471 |
| <b>WBS Element/<br/>PMC</b> 9.1.1   | <b>WBS Title</b><br>System Tests |                           |                         |   | <b>Contract Element</b>                         |                                       |
| <b>Date</b>   | <b>Revision No.</b>              | <b>Revision Authority</b> | <b>Approved Changes</b> |   | <b>Contract Line Item:</b>                      |                                       |
| <b>Specification No.</b>  | <b>Specification Title</b>       |                           |                         | <b>MPC/PMC</b>  | <b>Cost Description</b><br>Work order/Work Auth |                                       |
| <b>Technical Content</b><br>This element includes the effort to plan, develop, and document procedures, and conduct system level testing including the analysis and evaluation of test results. |                                  |                           |                         | <b>Cost Content-System Contractor</b><br>This element consists of Engineering Labor, Developmental Labor - Mechanical and Electrical, Developmental Material, Facilities, Outside Production and Production Material. |   |                                       |
| <b>Applicable Statement of Work Paragraph</b>   |                                  |                           |                         |   |   |                                       |

| Work Breakdown Structure Dictionary  |                     |                                   |  |                  |   | Contract Number<br>NAS 8-35471 |
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| Index Item No.   |                     | Life Sciences Program             |  | WBS Level        | 4 |                                |
| WBS Element/<br>PMC  | 9.1.2               | WBS Title<br>System Segment Tests |  | Contract Element |   |                                |
| Date   | Revision No.        | Revision Authority                | Approved Changes   |                  |   |                                |
| Specification No.  | Specification Title |                                   | MPC/PMC  |                  |   |                                |
| <b>Technical Content</b><br>This element includes the effort to plan and conduct System Segment Level Testing including the analysis and evaluation of test results. Segment Level tests are those tests below the system level. |                     |                                   | <b>Cost Description</b><br>Work order/Work Auth  |                  |   |                                |
| <b>Applicable Statement of Work Paragraph</b>  |                     |                                   | <b>Cost Content-System Contractor</b><br>This element consists of Engineering Labor, Training, Developmental Labor - Mechanical and Electrical, Developmental Material, Purchased Engineering, Production Labor - Mechanical and Electrical, Facilities, Purchased Equipment, Production Material, Outside Production. |                  |   |                                |

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## Work Breakdown Structure Dictionary

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|---|--|---------------------------|---|--|----------------------------|---------------------------------------|
| <b>Index Item No.</b> Life Sciences Program   |  |                           |   |  | <b>WBS Level</b> 3         | <b>Contract Number</b><br>NAS 8-35471 |
| <b>WBS Element/<br/>PMC</b> 9.2   | <b>WBS Title</b><br>Mockups/Simulators |                           |   |  | <b>Contract Element</b>    |                                       |
| <b>Date</b>   | <b>Revision No.</b>                    | <b>Revision Authority</b> | <b>Approved Changes</b>   |  | <b>Contract Line Item:</b> |                                       |
| <b>Specification No.</b>  | <b>Specification Title</b>             |                           | <b>Cost Description</b>   |  |                            |                                       |
| <b>Technical Content</b><br>The Mockup element includes the design, development, production and test of system or subsystem mockups/simulators needed for Engineering/Manufacturing development or hardware interface verification and control. |  |                           | <b>MPC/PMC</b>  |  |                            |                                       |
| <b>Applicable Statement of Work Paragraph</b>   |  |                           | <b>Work order/Work Auth</b>   |  |                            |                                       |
|   |  |                           | <b>Cost Content-System Contractor</b><br>This element consists of Engineering Labor, Developmental Labor - Electrical and Mechanical, Developmental Material, Production Labor - Mechanical, and Production Material. |  |                            |                                       |

| Work Breakdown Structure Dictionary   |              |  |                  |   |                     | Contract Number<br>NAS 8-35471 |  |
|---|--------------|--|------------------|---|---------------------|--------------------------------|--|
| Index Item No. Life Sciences Program  |              |  |                  |   | WBS Level 3         |                                |  |
| WBS Element/<br>PMC 9.3   |              | WBS Title<br>Test and Evaluation Support |                  | Contract Element                                |                     |                                |  |
| Date  | Revision No. | Revision Authority                       | Approved Changes |   | Contract Line Item: |                                |  |
| Specification No.   |              | Specification Title                      |                  | MPC/PMC   |                     |                                |  |
| <b>Technical Content</b><br>The Test and Evaluation Support element consists of all support elements necessary to operate and maintain systems and subsystems during testing and evaluation which are not consumed during a particular category of testing. Also included is the design and fabrication of test hardware configurations required to verify and control interfaces for fit, form and function. |              |  |                  | <b>Cost Description</b><br>Work order/Work Auth |                     |                                |  |
| <b>Element Task Description</b><br>Cost Content-System Contractor<br>This element consists of Production Labor - Mechanical, Developmental Labor - Mechanical, Production material, Engineering Labor, and Developmental Material.  |              |  |                  |   |                     |                                |  |
| <b>Applicable Statement of Work Paragraph</b>   |              |  |                  |   |                     |                                |  |

## Work Breakdown Structure Dictionary

|  |                                     |                                 |                         |  |   |                                       |
|--|-------------------------------------|---------------------------------|-------------------------|--|---|---------------------------------------|
| <b>Index Item No.</b> Life Sciences Program  |                                     |                                 |                         |  | <b>WBS Level</b> 3                              | <b>Contract Number</b><br>NAS 8-35471 |
| <b>WBS Element/<br/>PMC</b> 9.4  | <b>WBS Title</b><br>Test Facilities |                                 |                         |  | <b>Contract Element</b>                         |                                       |
| <b>Date</b>  | <b>Revision No.</b>                 | <b>Revision Authority</b>       | <b>Approved Changes</b> |  | <b>Contract Line Item:</b>                      |                                       |
| <b>Specification No.</b>   | <b>Specification Title</b>          |                                 |                         |  |   | <b>MPC/PMC</b>                        |
| <b>Technical Content</b>   |                                     | <b>Element Task Description</b> |                         |  | <b>Cost Description</b><br>Work order/Work Auth |                                       |
| <p>The Test Facilities element task consists of those special test facilities or sites required for performance of the various development tests necessary to prove the design and reliability of the system. Included are propulsion test fixtures, white rooms, test chambers, and any unique government test facilities required to conduct the tests.</p> <p>The brick-and-mortar type facilities allocable to industrial facilities are included.</p> |                                     | <p></p>                         |                         |  | <p>Cost Content-System Contractor</p>           |                                       |
| <p><b>Applicable Statement of Work Paragraph</b></p>   |                                     |                                 |                         |  |   |                                       |

| Work Breakdown Structure Dictionary  |                                      |                    |   |                  |  | Contract Number<br>NAS 8-35471 |
|--|--------------------------------------|--------------------|---|------------------|--|--------------------------------|
| Index Item No. Life Sciences Program   |                                      |                    |   |                  | WBS Level 2  | Contract Element               |
| WBS Element/<br>PMC 10.0   | WBS Title<br>Training and Simulation | Revision Authority |   | Approved Changes | Contract Line Item:  |                                |
| Date   | Revision No.                         | Revision Authority | Approved Changes                        |                  |  |                                |
| Specification No.  | Specification Title                  |                    |   |                  |  |                                |
| <b>Technical Content</b><br>The Training tasks includes the training services, personnel training materials, training aids, and training equipment required for Life Sciences Program factory, technical, flight and ground training.<br><br>The simulation tasks includes the facilities, equipment, material and personnel for factory, technical and module simulation.<br><br>The lower level elements are:<br>10.1 - Equipment<br>10.2 - Materials<br>10.3 - Services<br>10.4 - Facilities<br><br><b>Applicable Statement of Work Paragraph</b> |                                      |                    | <b>Element Task Description</b><br><br> |                  | <b>MPC/PMC</b><br><br><b>Cost Description</b><br>Work order/Work Auth<br><br><b>Cost Content-System Contractor</b><br>For cost purposes this is a summary item only. |                                |

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# Work Breakdown Structure Dictionary

|   |              |  |  |                  |  |  |                                |  |
|---|--------------|--|--|------------------|--|--|--------------------------------|--|
| Index Item No. Life Sciences Program  |              |  |  |                  | WBS Level 3  |  | Contract Number<br>NAS 8-35471 |  |
| WBS Element/<br>PMC 10.1  |              | WBS Title<br>Training and Simulation Equipment |  |                  | Contract Element   |  |                                |  |
| Date  | Revision No. | Revision Authority                             |  | Approved Changes | Contract Line Item:  |  |                                |  |
| Specification No.   |              | Specification Title                            |  |                  | MPC/PMC  |  |                                |  |
| Technical Content   |              | Element Task Description                       |  |                  | Cost Description<br>Work order/Work Auth   |  |                                |  |
| <p>The Training Equipment task includes the materials and services required to provide the end items of the training equipment.</p> <p>Examples:</p> <p>Technical<br/>Operational Trainers<br/>Ground Crew Trainers<br/>Cutaways<br/>Training Mockups<br/>Models</p> <p>The simulation equipment task includes the materials and services required to provide the end items of simulation equipment. Examples:</p> <p>Simulated Laboratories<br/>Working Models, Simulators<br/>Mockups</p> <p>Applicable Statement of Work Paragraph</p> |              |  |  |                  | <p>Cost Content-System Contractor<br/>The element consists of Production Material and personnel.</p> |  |                                |  |

| Work Breakdown Structure Dictionary  |              |  |                  |   |  | Contract Number<br>NAS 8-35471           |  |
|--|--------------|--|------------------|---|--|--|--|
| Index Item No.   |              | Life Sciences Program                          |                  | WBS Level   |  | 3  |  |
| WBS Element/<br>PMC 10.2   |              | WBS Title<br>Training and Simulation Materials |                  | Contract Line Item:   |  | Contract Element                         |  |
| Date   | Revision No. | Revision Authority                             | Approved Changes | MPC/PMC   |  | Cost Description<br>Work order/Work Auth |  |
| Specification No.  |              | Specification Title                            |                  | <p>Cost Content-System Contractor<br/>This element consists of Production Labor - Mechanical and Electrical, Developmental Labor - Electrical, and Production Material.</p> |  |  |  |
| Technical Content<br>This element includes the expendable material used for Training and Simulation. |              | Element Task Description                       |                  | <p>Applicable Statement of Work Paragraph</p>   |  |  |  |



## Work Breakdown Structure Dictionary

|   |  |                           |  |                            |                         |                                       |
|---|--|---------------------------|--|----------------------------|-------------------------|---------------------------------------|
| <b>Index Item No.</b> Life Sciences Program   |  |                           |  |                            | <b>WBS Level</b> 3      | <b>Contract Number</b><br>NAS 8-35471 |
| <b>WBS Element/<br/>PMC</b> 10.3  | <b>WBS Title</b><br>Training and Simulation Services |                           |  |                            | <b>Contract Element</b> |                                       |
| <b>Date</b>   | <b>Revision No.</b>                                  | <b>Revision Authority</b> | <b>Approved Changes</b>  | <b>Contract Line Item:</b> |                         |                                       |
| <b>Specification No.</b>  | <b>Specification Title</b>                           |                           | <b>Cost Description</b>  |                            |                         |                                       |
| <b>Technical Content</b><br>This Training and Simulation element includes skills/certification training of manufacturing personnel and other services required for training and simulation.<br><br>Applicable Statement of Work Paragraph |  |                           | <b>MPC/PMC</b><br><br><b>Cost Content-System Contractor</b><br>This element consists of Engineering Labor, Developmental Labor - Mechanical, Production Labor - Mechanical, Training, Production Material. |                            |                         |                                       |

| Work Breakdown Structure Dictionary  |   |                    |                                 |  |  | Contract Number<br>NAS 8-35471 |
|--|---|--------------------|---------------------------------|--|--|--------------------------------|
| Index Item No. Life Sciences Program   |   |                    |                                 |  | WBS Level                                | 3                              |
| WBS Element/<br>PMC 10.4   | WBS Title<br>Training and Simulation Facilities |                    | Contract Element                |  |  |                                |
| Date   | Revision No.                                    | Revision Authority | Approved Changes                |  |  |                                |
| Specification No.  | Specification Title                             |                    | MPC/PMC                         |  | Cost Description<br>Work order/Work Auth |                                |
| <b>Technical Content</b><br>This Training and Simulation Facilities element includes the special construction and/or construction/conversion necessary to accomplish training simulation objectives. |   |                    | Cost Content--System Contractor |  |  |                                |
| <b>Applicable Statement of Work Paragraph</b>  |   |                    |                                 |  |  |                                |

# Work Breakdown Structure Dictionary

Contract Number  
NAS 8-35471

WBS Level 2

Index Item No. Life Sciences Program

Contract Element  
Contract Line Item:

WBS Element/  
PMC 11.0 WBS Title  
Mission Operations

Date Revision No. Revision Authority Approved Changes

Specification No. Specification Title

MPC/PMC Cost Description  
Work order/Work Auth

## Element Task Description

**Technical Content**  
This element includes all activities involved in performing on-orbit life sciences experiments including specimen and data analysis and laboratory operations.

Applicable Statement of Work Paragraph

Cost Content-System Contractor